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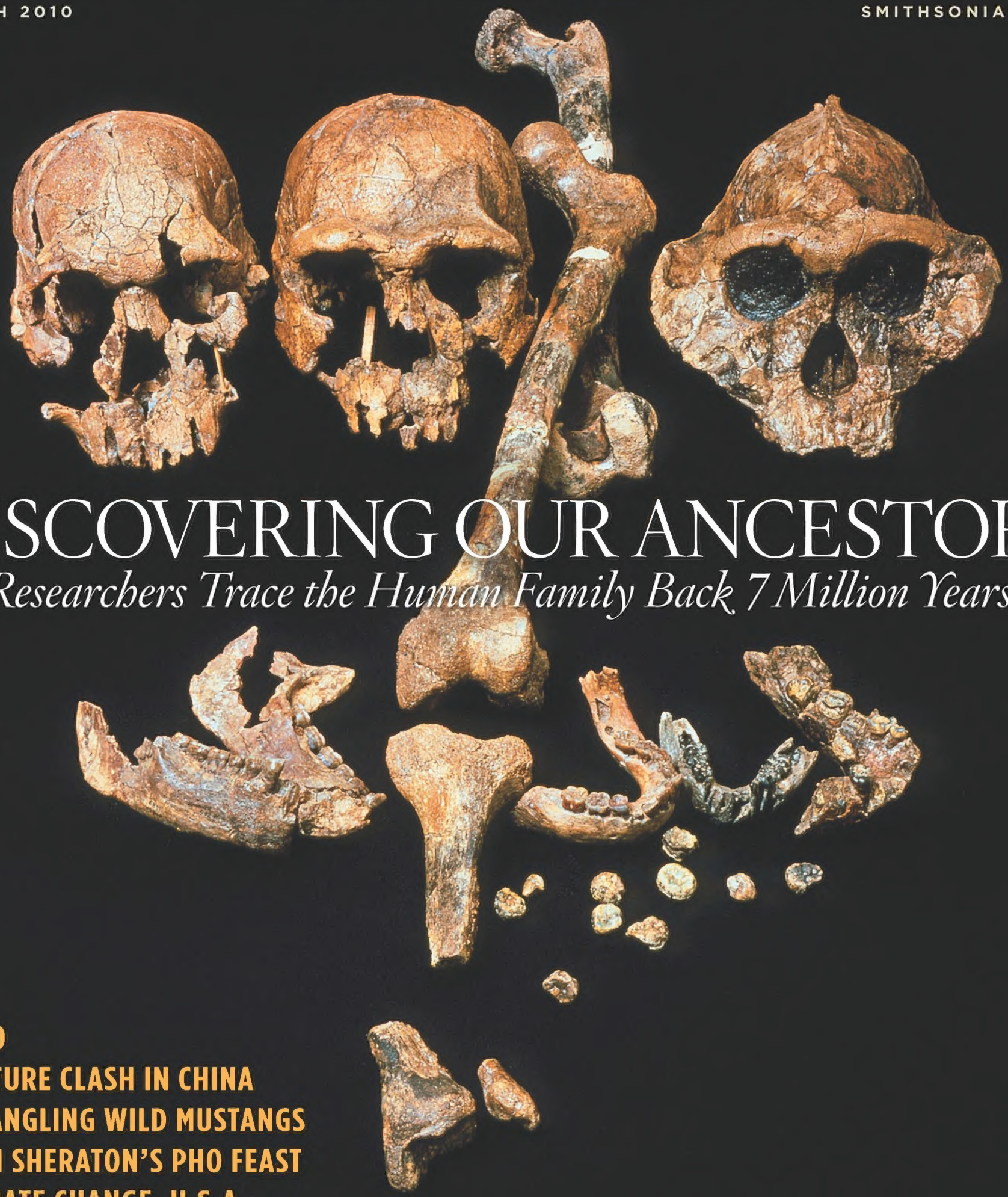

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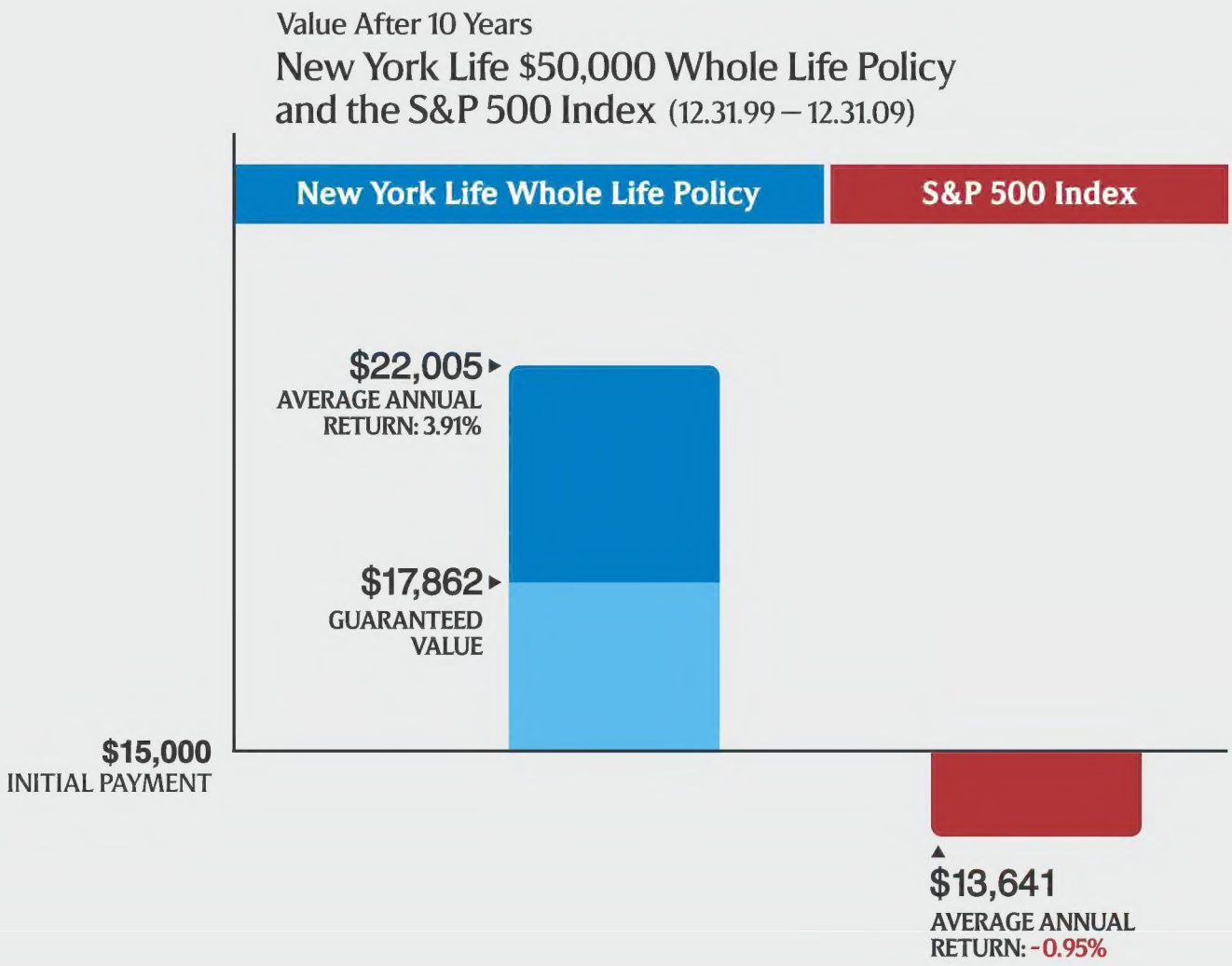

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ON THE COVER
Fossils of three hominid species that lived contemporaneously 1.5 million years ago.
PHOTOGRAPH BY JOHN READER / PHOTO RESEARCHERS, INC.

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Kashgar (a teahouse) is a "source of anxiety for Beijing, as is Tibet and Taiwan," says an expert.
PHOTOGRAPH BY MICHAEL CHRISTOPHER BROWN

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FROM THE EDITOR

Big Digs

Excavations in Ethiopia and Lockport, New York

BY CAREY WINFREY

ANN GIBBONS, who wrote our cover story ("Our Earliest Ancestors," p. 34), has been covering human evolution since the early 1990s and is the author of *The First Human: The Race to Discover Our Earliest Ancestors* (2006). For that book, she visited several hominid field sites in Africa, but she was unable to wangle an invitation to the site in Ethiopia where the first pieces of a skeleton of "Ardi," a pivotal hominid who lived 4.4 million years ago, were found in 1994.

Gibbons (rear): "My one big wish."

"That was my one big wish," she says, to go to Ethiopia. Then, in November 2008, Tim White, the lead researcher on the ongoing Ardi project, invited her to do just that. "A couple of weeks later, there I was."

She would not be disappointed. "One day, coming back from a fossil site, we were on this dusty plain on the Great Rift Valley floor, and in front of us was this volcano and the moon rising over Lake Yardi. Behind us the sun was setting. Tim said something about hominids seeing this moon rising over water here for millions of years. Ethiopia's Middle Awash is the place where there's the longest record of human evolution anywhere on the planet; it covers a vast span of human evolution, from 5.8 million to 160,000 years ago. To be in this spot was magical. I've been to a number of field sites, but this one was sort of a life-changing trip for me."

TO JOYCE CAROL OATES' prolific outpouring of novels, short stories, essays, plays and books for children, add the charmingly affecting piece in this issue, "Going Home Again," page 74. SMITHSONIAN's Megan Gambino reached the 71-year-old writer by phone at her home in Princeton, New Jersey.

How much had you thought about "home" prior to this assignment?
Probably more than most people. Because I'm a novelist, a writer of fiction, I probably do think of these things fairly often, fairly consistently. I have stories and novels that are set in my hometown area, and childhood memories are written about. We tend to write about what we know.

Can you talk about how you approached this?
I write in longhand. When I went to Lockport, in October, I was driven around by a relative. I just took notes on everything that I did; I described things. The canal. My old school. I didn't invent anything.

At the end of the essay, you say that a question asked by an audience member during your presentation didn't seem very Lockportian. How so?
I've never considered Lockport a place where theoretical, philosophical or intellectual ideas were much discussed. It was a very welcome surprise.

COURTESY OF ANN GIBBONS

For the entire Joyce Carol Oates interview, and other author interviews, go to Smithsonian.com/authors

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DAVID STARES / ALAMY

The cave-based Hotel Sidi Driss in southern Tunisia.

LETTERS READERS RESPOND TO THE **JANUARY** ISSUE

Thanks for telling "The Truth About Lions" and identifying human population growth as the main cause of their decline. Earth's population is headed for over nine billion this century, expansion that destroys lion habitats and places both animals and our planet in peril.

JACK HART, PORTLAND, OREGON

HAIL TO THE KING

HAVING TRAVELED in the Serengeti and then into the Ngorongoro Crater, I've seen many lions. Even when they are resting, there is no denying these magnificent creatures are truly the king of beasts. Even though we were in safari jeeps, their presence overwhelmed us as they strolled within arm's length. In the Ngorongoro Crater, one big male, in his haste to avoid three menacing males, walked so close to our vehicle we could hear him breathe. Fortunately, he escaped into the tall grasses on the crater floor, but not before he gave us all a thrill of a lifetime.

SUSAN GALLION
YORK, PENNSYLVANIA

WE ARE disappointed in the author's comment citing hunting as a cause of Tanzania's "crashing lion population." Kenya outlawed big game hunting in the late '70s. Since then its game populations have declined. Why? On the other hand, Tanzania has had both a thriving hunting industry and thriving game populations. The cow, pig and chicken are the most persecuted animals on earth, but money they generate ensures their prolific populations.

JOHN ANTANIES
PHOENIX, ARIZONA

PICTURING PHINEAS GAGE

In response to our story about the recently discovered photograph of Phineas Gage ["Finding Phineas"], a famous figure in neuroscience circles because of the dramatic brain injury he sustained in 1848, we received a number of letters asking if we flopped or reversed the photograph. We did, because it originated as a daguerreotype, which is almost always a mirror image of the actual subject, and we chose to show Gage as he was, not as he appeared in the original picture. (We explained our decision in the photo credit line.) We also received a letter from Phyllis Gage Hartley, a relative of Phineas Gage, who sent us a

photograph of Phineas (above) that was evidently not taken at the same time and place as the one we published. "I grew up with the Phineas story," writes Hartley, 84, of Maplewood, New Jersey. She says she wants to "set the record straight" about which eye was damaged. Because her photograph is itself of historic interest, we sent a copy to Malcolm Macmillan, of the University of Melbourne, author of An Odd Kind of Fame: Stories of Phineas Gage, *and his collaborator, Matthew L. Lena, of Boston. Here is their reply.—Editor*

We are pleased to comment on Mrs. Phyllis Gage Hartley's very important image of Phineas Gage. It appears to be identical to one recently sent to us by Tara Gage Miller of Texas. Significantly, the Hartley-Miller photograph, coming independently from two branches of the Gage family, further confirms that the young man in the photograph owned by Beverly and Jack Wilgus and published in SMITHSONIAN was in fact Phineas Gage. After examining the Hartley-Miller image themselves, the Wilguses concluded that it's a reproduction of a daguerreotype (or similarly produced image), and we agree. Thus the Hartley-Miller photograph is a mirror image, which is why Gage's right eye appears injured in that photograph, but his left eye is injured in the one previously published in the magazine. (Phineas' life mask and skull, which are still preserved, as well as contemporaneous medical examinations, concur that all the damage, including that to his eye, was on the left side.) Mrs. Hartley's photograph contains important clues for future research. We encourage readers to learn more and help answer our research questions at: http://www.deakin.edu.au/hmnbs/psychology/gagepage

WURST CHOICES

HAVING WRITTEN recently about sausages, I looked forward to reading Andrew Blechman's "Wurst Case Scenario," but I was disappointed to see his willful maligning of German cuisine. I lived in Germany for 15 years and can assure you that German cooking is certainly no longer the stereo-

COURTESY OF PHYLLIS GAGE HARTLEY

typical meat-and-potatoes fare that he describes. Several of Blechman's other assertions are also incorrect. Mediterranean foods were already popular in Germany by the mid-1970s, not the late 1980s. French cuisine has long influenced German chefs in the Baden region adjacent to France. German meals are usually not "served all at once," but often in three courses, beginning with soup and ending with dessert, nor is the food quickly gobbled down (bad manners). Some meats are indeed cooked medium-rare, including pork and duck. If German cuisine were as bad as Blechman describes it, why does Germany have 225 Michelin-starred restaurants, including more three-star restaurants than any country in Europe except France?

SHARON HUDGINS
MCKINNEY, TEXAS

I LOVED "Wurst Case Scenario." It saddens my heart to know that the arts of butchery and charcuterie are dwindling away. As a chef, I truly understand how old this craft is. The world's palate is evolving back to natural foods. I, for one, totally support this movement. Hopefully, though, we won't forget that a little *Fleisch* can be naturally good for us too. How you ever found a German butcher turned vegetarian with a guilty conscience is beyond me. It was too funny!

ZACHERY ZIETLOW
ROSHARON, TEXAS

EXAMINING MYTHS

MR. FERLING did not refute the idea that Saratoga was the war's turning point ["Myths of the American Revolution"]. He redefined the argument by stating there was "no single decisive event." Of the other "key moments" he listed, none but the failure of the British Southern strategy made the war's outcome inevitable. While Victory at Yorktown effectively ended the war, it was predicated upon the 1778 Franco-American alliance (a direct result of the American victory at Saratoga) and, due to the need to defend Britain's growing worldwide empire, the British policy of waging limited warfare. Once France entered the war (1778), followed by Spain (1779) and the Netherlands (1780), Britain could no longer afford to concentrate its military might in America.

JOE FINAN
SARATOGA NATIONAL HISTORICAL PARK
STILLWATER, NEW YORK

CORRECTION:

The 1780 Battle of Kings Mountain ["Myths of the American Revolution"] did not take place in North Carolina, as the article stated. It was fought in the South Carolina part of the Kings Mountain range.

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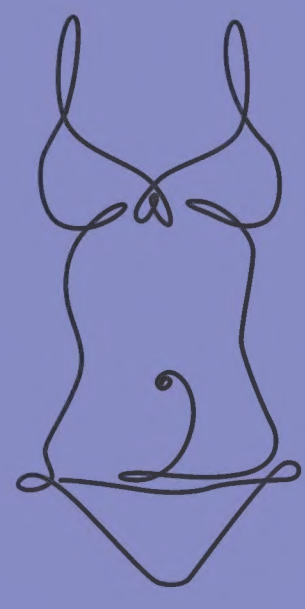

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WILD THINGS

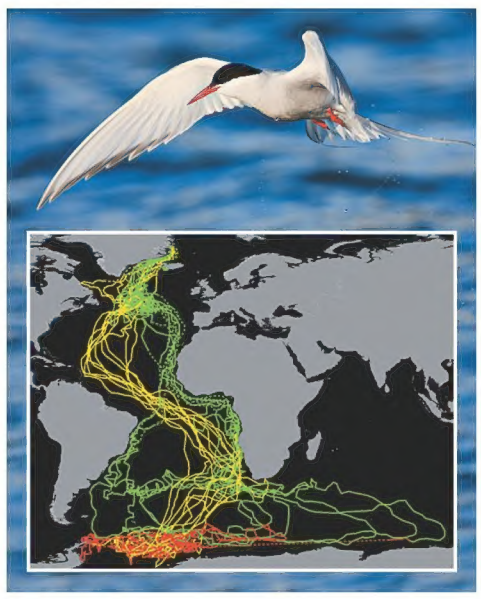
LIFE AS WE KNOW IT

BY T.A. FRAIL, MEGAN GAMBINO, ABIGAIL TUCKER AND SARAH ZIELINSKI

BIRDS, BEES—CRICKETS?

Orchids on Reunion Island in the Indian Ocean are pollinated by nocturnal crickets, according to scientists who took night-vision video of the flowers. It's the first time an insect from the cricket order has been identified as a pollinator. The raspy cricket's head is just the right size to reach into the flower's nectar spur.

Watch the pollinating cricket at Smithsonian.com/WildThings



THE LONGEST HAUL

Scientists have proven that the Arctic tern makes the longest annual migration of any animal in the world. Researchers attached miniature geolocators to terns nesting in Greenland and Iceland and found that the four-ounce birds traveled nearly pole to pole (left: their routes; green for autumn, red for winter, yellow for spring), averaging 44,000 miles in ten months. For a bird that can live 30 years or more, that means 1.5 million miles in a lifetime, the equivalent of three trips to the moon and back.

REJECTION NOTICE

Cane toads in South America inflate their bodies to intimidate predators. Now University of Sydney-led researchers say females, which are usually larger than males, can displace unwanted suitors by puffing up with air. A female may not want to mate with the first male to grab her and risks drowning if too many males latch on at once.

Observed

NAME: *Alligator mississippiensis*, the American alligator.
WHAT'S OLD: Gators have been around for 200 million years.
WHAT'S NEW: Air flows through their lungs in only one direction, delivering oxygen in a continuous loop, according to a University of Utah study.
WHAT MATTERS: Previously, only birds were known to have "unidirectional" lungs, which deliver oxygen more efficiently than "tidal" lungs, like ours, in which air enters and exits along the same route. The discovery suggests that such lungs evolved much earlier than anyone thought—more than 246 million years ago, in a common ancestor of birds, crocodilians and dinosaurs.

ROGIER VAN VUGT; MICHENAU AND FOURNEL / RBG KEW; OLE JØRGEN LIODDEN; MAP: GREENLAND INSTITUTE OF NATURAL RESOURCES; KLAUS NIGGE / NATIONAL GEOGRAPHIC STOCK; CHRIS MATTISON / FLPA / MINDEN PICTURES (CAPTIVE)

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The Vigil

Shelby Lee Adams' 1990 photograph of Appalachian life captured a poignant tradition

BY ABIGAIL TUCKER

ESTHER RENEE ADAMS was born on her grandmother's birthday, June 2, and was named for her, though eventually, after "Mamaw" started calling her "Nay Bug" (because she was scared of ladybugs), everyone else did, too. No granddaughter loved her grandmother more. Mamaw could take the smart out of a wasp sting and hold her own in bubble-gum-blowing contests. She was always game to slice into the Fourth of July watermelon a few days early.

Mamaw died of emphysema in July 1990, when Nay Bug was 7. "Half of me died, too," she says.

Mamaw was laid out in her own home. In the mountains of eastern Kentucky, such "country wakes" could last for days, as mourners emerged from the coal mines or drove out from the factories. Sometimes so many people showed up, the parlor floor had to be reinforced. Guests paid their respects to the dead, then went into another room for sandwiches, coffee and a long visit.

Not Nay Bug. While people talked outside, "you know where I was?" she asks. "Right there with my Mamaw. I stayed up with her all night."

And when a man with a camera came and asked to take her picture, she said she wanted to lay a rose across her grandmother's chest. "He said, 'Sure, if it's what you want to do,' " Nay Bug recalls. Then he took the picture.

"Half of me died, too," says Esther Renee Adams (far right), whose grandmother called her "Nay Bug."

"Nay Bug" (with ex-husband Jamie in 2008) wouldn't see *Home Funeral* for 19 years.

Home Funeral would become one of Shelby Lee Adams' best-known portraits of Appalachian life.

Adams wouldn't see Nay Bug again for 18 years. He found her in the summer of 2008 at the head of Beehive Hollow, up a winding road, living in a house without running water or electricity. A coal-black teardrop was tattooed by the corner of her eye. Adams began photographing her again.

For 36 years, Adams has spent his summers in several rural Kentucky counties, watching children grow up, families flourish or fall apart and green mountains crumble after years of coal mining. Coal dust feels omnipresent in Adams' pictures, which he shoots almost exclusively in black-and-white.

Adams (in 2009): into the shadows

His portraits of "the mountain people," as he calls them, are intimate, direct and sometimes bleak. Some critics—including those featured in *The True Meaning of Pictures*, a 2002 documentary film about Adams' work—say he exploits a region already saddled with stereotypes involving poverty and violence. Adams says he's capturing a fading culture—home wakes, for instance, are now less common in the mountains—and the faces of old friends. "When [critics] are taken out of their middle-class comfort zone, they are confronted with another person's humanity," he says. "And they blame the photographer."

Adams, 59, has roots in both the mountains and the middle class. He lives in western Massachusetts but was born in Hazard, Kentucky, not far from where he takes his portraits. He is distantly related to Hobart Ison, an Appalachian who in 1967 fatally shot a filmmaker on his land, but Adams' father was a supervisor for a natural gas company with contracts around the country, and his family often lived in cities, including New York and Miami. When Adams returned to Kentucky for part of each year, he says, his father taught him to look down on the "holler dwellers."

Then one summer an uncle, a country doctor, introduced him to some of the most isolated mountain families. When Adams went back later, he says, he was mesmerized by their openness before his lens; photographing them would become his life's work. Today he knows how accents vary from hollow to hollow, who has a sulfurous well, who's expecting a baby.

The darkness he has sometimes seen in Appalachia only makes him want to look closer. "Within the shadows lie the depth and beauty of human beings," he says. "Until we understand our own darkness, we won't understand our beauty."

His subjects appreciate his presents of canned hams and clothing at Christmastime and the occasional case of beer; they are also eager to see his photographs. "Country people love pictures," Adams says. Almost every house or trailer has some on display: church and prom portraits, sonograms and sometimes Adams' work.

But not everyone likes his images.

"I guess I don't see the point of freezing yourself in time," says Christopher Holbrook, the baby in his mother's arms in *Home Funeral* and now a dimpled 20-year-old in dusty jeans. "The past is supposed to be past." Chris is the first person in his family to graduate from high school; he has also taken courses in diesel mechanics at Hazard Community College. He recently married and now works as a security guard. No picture, he says, can tell him what his future holds.

Walter Holbrook, Chris' father and Mamaw's son, takes a different view. *Home Funeral* is "something I can show my kids and maybe later on they can save to show their kids what kind of family they had," he says.

"Somebody said Shelby takes these pictures to make fun of people," Nay Bug says. "You know what I think? It's not to make them look bad. It's the way you look at it. He doesn't mean to make fun of the poor people. He's showing how hard it is for us to live."

She had never seen *Home Funeral* until Adams visited last summer. She stared at the photograph for a long time. "Now, Jamie, I want you to look at something," she told her former husband. "Just look right here." A real teardrop slipped past the tattooed one near her eye. "That's me."

Staff writer **ABIGAIL TUCKER** *also writes on mustangs in this issue (p. 68).*

SHELBY LEE ADAMS; BILL SCHWAB; PP. 8-9 SHELBY LEE ADAMS

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READER CONTRIBUTIONS TO OUR WEB SITE

YOUR KIND OF TOWN

OAK HILL, FLORIDA
BY SHANNON HUDNELL

WITH A POPULATION of less than 1,500 people this historic town near the Canaveral National Seashore is a must-see for those wanting a feel for what old Florida was like. It appeared on a nearly 500-year-old map as an Indian village and has some of the only virgin land on Florida's east coast. Driving around, one can view horses, cows, goats, large yards with swings blowing in the wind and blooming trees. Unlike most of Florida, Oak Hill (above) is not a tourist town. You won't find hotels here, but there are a few small cabins, and RVs are welcome. What is there to do? Enjoy the peace and quiet. Pretend you're back in time and go fishing on one of the city piers, or take a boat out and explore Mosquito Lagoon. Just don't forget your mosquito repellent if you go during the hotter months.

READY, AIM, CLICK

On March 1, our 8th Annual Photo Contest will open for new entries. We'll also announce the finalists for the 7th Annual Contest; vote for your favorite in the Readers' Choice category. Learn more at Smithsonian.com/photocontest

A finalist from the 6th Annual Photo Contest, by Marc Piscotty.

RECIPE FOR SUCCESS

When Winnie-the-Pooh gets stuck in Rabbit's doorway after eating too much honey and Rabbit hangs dish towels on Pooh's legs, we learn one can always make oneself useful.

—Cristie Roberson, of Middleton, WI, on "What Children's Books Taught Us about Food" Smithsonian.com/foodbooks

CHANNELING WOODY

I was skeptical about Jonatha Brooke's new album *The Works*. But if you can listen to "My Sweet and Bitter Bowl" without getting the shivers, you're a better man than me. Kudos to Nora Guthrie and Brooke (right) for giving Woody Guthrie's work a whole new wonderful life.

—Dave Schoeff, of Toledo, Ohio, on "Woody Guthrie's Music Lives On" Smithsonian.com/guthrie

ALLAN G. HUGHES; © WALT DISNEY CO. / COURTESY EVERETT COLLECTION; MARC PISCOTTY; FABRICE COFFRINI / AFP / GETTY IMAGES

THIS MONTH IN HISTORY

MARCH ANNIVERSARIES
MOMENTOUS OR MERELY MEMORABLE

BY ALISON McLEAN

210 YEARS AGO
KEEPING CURRENT

In a report to London's Royal Society in March 1800, Italian physicist Alessandro Volta describes his voltaic pile, now better known as the first electric battery. Using layers of copper, zinc and wet cardboard in a closed circuit, Volta produces current and electrifies science. The volt is named after him in 1881.

100 YEARS AGO
WINGED VICTORY

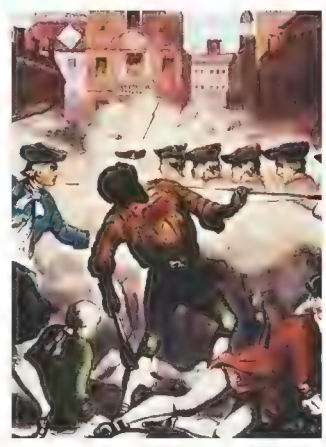
On March 8, 1910, French actress, balloonist and artist Raymonde de Laroche becomes the world's first licensed woman pilot. Determined to fly after taking a single airplane ride, de Laroche—born Elise Deroche in 1886—is taught by aviator and plane-maker Charles Voisin. "Flying does not rely so much on strength as on physical and mental coordination," she tells reporters. De Laroche wins the 1913 Femina Cup and sets two women's altitude records before being killed in a 1919 plane crash while trying to become a test pilot.

200 YEARS AGO POET OF THE PIANO

Frédéric Chopin is born near Warsaw, Poland, on March 1, 1810, according to his family (although a church record says February 22). A piano prodigy, he begins composing by age 7. Although Chopin will spend most of his adult life in France, childhood travels to country estates in Poland with his father, a teacher of French, expose him to the folk music that will infuse his classical works. Praised as a genius by Robert Schumann in an 1831 review, the composer becomes known for his emotion-filled, technically innovative piano pieces. He dies of tuberculosis in 1849 in Paris, at age 39.

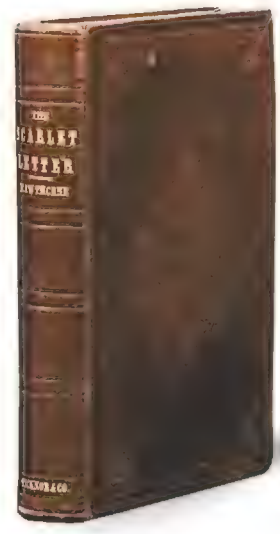
240 YEARS AGO MASSACRE IN BOSTON

Tensions between Massachusetts colonists and British soldiers sent to enforce duties on paper, lead, glass and tea ignite March 5, 1770, when a sentry at Boston's Customs House, having struck a colonist, is pelted with snowballs and debris by a mob. Soldiers who come to the sentry's aid, led by Capt. Thomas Preston, are surrounded. When one is hit by a stick, they fire into the crowd, fatally wounding five colonists—including Crispus Attucks, a black sailor. Samuel Adams uses the "bloody massacre" to rally support for independence. Preston, defended by John Adams, is acquitted of murder.



160 YEARS AGO RED LETTER DAY

Nathaniel Hawthorne publishes *The Scarlet Letter* March 16, 1850. Written in six months, the tale of Hester Prynne, Arthur Dimmesdale, Roger Chillingworth and adultery, guilt, revenge and morality in Puritan New England is "positively a hell-fired story," the author tells a friend. A critical and popular success—"nearly perfect," one review calls it—the first edition of 2,500 copies sells out in two weeks and makes Hawthorne's reputation. One of the early mass-produced books in America, it has never been out of print.



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Around the Mall

SCENES AND SIGHTINGS FROM THE SMITHSONIAN MUSEUMS AND BEYOND

From the Castle p. 16
The Object at Hand p. 18
Q&A: Rick Potts p. 20
What's Up p. 22

Homo heidelbergensis—one of five sculptures crafted for the new exhibition hall—takes shape at a Baltimore foundry.

SEAN MCCORMICK

MEET THE FAMILY

A NEW EXHIBITION HALL, DEDICATED TO THE ORIGINS OF HUMANKIND, OPENS THIS MONTH AT THE SMITHSONIAN NATIONAL MUSEUM OF NATURAL HISTORY

PAGE 17

Becoming Us

BY G. WAYNE CLOUGH

WHY DO OUR wisdom teeth often cause problems, and why do we have relatively hairless skin? The answers come from our distant past. Anyone with Internet access will soon be able to solve such mysteries in the Smithsonian's compelling Web site, "Human Origins: What Does It Mean to Be Human?" (humanorigins.si.edu). The National Museum of Natural History's new David H. Koch Hall of Human Origins, opening March 17, marks a milestone in the Institution's long involvement with the study of early humans. Field research, 3-D and other digital images available to all on the Web site, educational and public programs will complement the new $20.7 million hall, which tells the epic story of how a single human species emerged over time and spread worldwide. Less well known is that during most of this journey, two or more species of early humans existed simultaneously. After several million years, one lineage led to . . . us! (See "Our Earliest Ancestors," p. 34.)

The 15,000-square-foot hall focuses on the ways defining characteristics of the human species developed as our ancestors adapted to a changing environment. A time tunnel introduces earlier human species. Visitors learn about major changes in climate and other key events in humanity's evolution. And they look into the eyes of distant ancestors in forensically reconstructed life-size faces. More than 75 skull reproductions, a human family tree and virtual tours of key research sites illuminate our ancestors' increasing brain size, technological expertise and artistic creativity. Lead curator Rick Potts says the hall will help define humanity's "cultural and biological characteristics and how those traits emerged during one of earth's most dramatic eras of environmental change." Potts' book, *What Does It Mean to Be Human?*, published in conjunction with the new hall, details the evidence for human evolution and for connecting the emergence of human traits to changes in climate over millions of years.

The new hall at the Natural History Museum (and humanorigins.si.edu) explains our ancestral tree.

Our Human Origins initiative exemplifies the Smithsonian's growing resources for teachers, students and lifelong learners. As Carolyn Gecan, a teacher in Fairfax County, Virginia, says: "I can now send my students on virtual field trips to Olorgesailie, Rick Potts' field site in Kenya." The initiative also demonstrates how our Web sites extend our reach hundredsfold as we take our cutting-edge research, vast collections, exciting new exhibits and behind-the-scenes activities worldwide—inspiring wonder, encouraging curiosity and delivering knowledge, including explanations of why our wisdom teeth frequently cause trouble and why we aren't covered in fur. (Our ancestors had larger jaws so they could chew tough food. With the development of tools and cooking, our food became easier to chew—and our jaws got smaller, often unable to accommodate wisdom teeth. Bare skin helps dissipate heat; in the places early humans evolved, overheating was more of a problem than being too cold.)

G. WAYNE CLOUGH *is Secretary of the Smithsonian Institution.*

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G. Wayne Clough

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NMNH, SI (3)

Sculpting Evolution

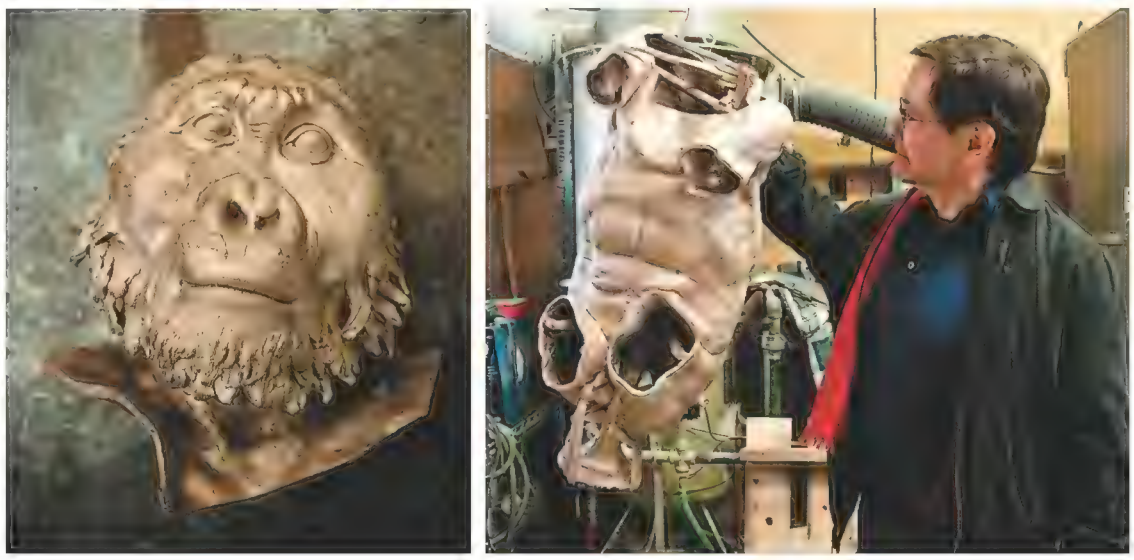
A SERIES OF STATUES BRINGS US FACE TO FACE WITH OUR EARLY ANCESTORS

RICK POTTS peers expectantly into the face of *Homo heidelbergensis*—"Mr. Heidi," the anthropologist calls the bronze statue of our 700,000-year-old ancestor. "There's the brow ridge!" Potts exclaims, as a worker at Baltimore's New Arts Foundry chips away at the ceramic cast covering the sculpture's features. "And the nose!"—which was large and raised, allowing *H. heidelbergensis* to warm the air it inhaled, an adaptation for cold environments. One by one, tufts of beard are chiseled free, and the sculpture's eyes, now wiped clean of dust, project a keen metallic gaze. *H. heidelbergensis* isn't smiling, exactly (those facial muscles had yet to evolve), but his expression is tentative—almost kindly. "Hopeful," Potts calls it.

Once installed alongside four other sculptures of early humans at the National Museum of Natural History's David H. Koch Hall of Human Origins—which opens March 17 to celebrate the museum's 100th anniversary—the finished *H. heidelbergensis* will crouch over a fire, preparing a piece of roast like any modern barbecue maestro (except that Mr. Heidi is completely naked).

To help us imagine our distant ancestors, Potts, the director of the museum's Human Origins Program, and sculptor John Gurche condensed a two-million-year period of human evolution into a series of five bronzes. But they rejected the clichéd visual timeline of slouchy ape gradually transforming into a *Homo sapiens* with ramrod posture. Rather, the museum's sculpture series tells a less linear story, Potts says, that challenges "the inevitability of us."

Upon entering the exhibit hall, you'll first see a tableau that includes lanky *Homo erectus*, who emerged 1.8 million years ago. She will be gripping a stone tool and lumbering along with a dead antelope on her back. Gurche sculpted a female, Potts explains, because the most complete skull for Gurche to study was female. Also, "we wanted to contest the idea of males bringing home the bacon."



Paranthropus boisei **(left), a.k.a. "chewing machine," was an insatiable vegetarian that lived up to 2.3 million years ago. Potts (right) says the works challenge "the inevitability of us."**

H. erectus will be eyeing a statue of her contemporary, *Paranthropus boisei*, an insatiable vegetarian whom Gurche calls a "chewing machine" and who lived between 2.3 million and 1.2 million years ago. *P. boisei*, who has massive jaw muscles and teeth, tugs at an unappetizing-looking root. His hands are human, but his gaze is slightly bovine, and he seems oblivious to everything except his tubers. "Paranthropus" means "next to man"; he is not a direct ancestor of contemporary humans, and after a million years, his species died out.

Next comes *H. heidelbergensis* (who likely harnessed fire), followed by a Neanderthal (*Homo neanderthalensis*) mother and child, who would have lived some 60,000 years ago. As the toddler peers over her shoulder, the mother is preparing hides for her family to wear. (Clothing at last!) Neanderthals were socially developed enough to bury their dead.

Another statue portrays a less exalted relation: tiny *Homo floresiensis*, who had a wee brain and huge feet and ate rats and lizards. "Flo," as Gurche sometimes calls her, is shown recoiling in terror from something—perhaps a cloud of volcanic ash that blanketed the Indonesian island where her kind lived a mere 18,000 years ago. Doomed *H. floresiensis* "suggests we're more fragile than we thought," Potts says.

The sculptures emphasize that our predecessor species did not simply succeed one another, each hominid more evolved than the last. Rather, several overlapped in time—*P. boisei* with *H. erectus*, and early *H. floresiensis* with the late Neanderthals—adopting different survival strategies as they competed for resources. By featuring oddball cousins such as *P. boisei* and *H. floresiensis*—as opposed to possible direct ancestors like *Australopithecus africanus*—the exhibit demonstrates that modern humans, with our jumbo brains, are just another iteration of this family tree, and not evolution's inevitable grand finale.

Seeing the exquisite artwork, though, it is hard not to feel the slightest bit smug about our species' accomplishments. As we toured the Baltimore foundry, we watched the mold of Mr. Heidi's torso being fired in the kiln.

"There's a touch of pyromania about this business," remarks foundry owner Gary Siegel as we admire the licking flames.

"It all started with *heidelbergensis*," Potts responds. **ABIGAIL TUCKER**

SEAN MCCORMICK (2)

Read more about the new hall at Smithsonian.com/humanorigins

THE NATIONAL MUSEUM OF NATURAL HISTORY • **NEANDERTHAL SKELETON**

Beyond Bones

A rare cache of hominid fossils offers a window on Neanderthal culture

BY OWEN EDWARDS

IN 1856, LABORERS WORKING in a limestone quarry in the Neander Valley near Düsseldorf, Germany, dug up some unusual-looking bones. Subsequent study revealed that they belonged to a previously unknown species of humans, similar to, but distinct from our own species, *Homo sapiens*. The newly discovered hominid was named Neanderthal—*thal* is Old German for valley—and has fascinated anthropologists ever since.

It was first thought that Neanderthals may have resembled apes—with stooped posture and bent knees—more closely than modern humans. Then, in the 1950s, Smithsonian anthropologist Ralph Solecki, a team from Columbia University and Kurdish workers unearthed the fossilized bones of eight adult and two infant Neanderthal skeletons—spanning burials from 65,000 to 35,000 years ago—at a site known as the Shanidar cave, in the Kurdistan area of northern Iraq. The discovery changed our understanding of Neanderthals.

The early hominids walked upright and possessed a more sophisticated culture than had previously been assumed. One of the skeletons, excavated in 1957, is known simply as Shanidar 3. The male Neanderthal lived 35,000 to 45,000 years ago, was 40 to 50 years old and stood about 5-foot-6. Shanidar 3 now resides at the Smithsonian National Museum of Natural History, showcased inside a highly secure glass enclosure that Rick Potts, director of the museum's Human Origins Program, describes as a "fossil treasure case." Shanidar 3, Potts adds, "is the Hope Diamond of the Human Origins collection, and we treat it accordingly."

Solecki's pioneering studies of the Shanidar skeletons and their burials suggested complex socialization skills. From pollen found in one of the Shanidar graves, Solecki hypothesized that flowers had been buried with the Neanderthal dead—until then, such burials had been associated only with Cro-Magnons, the earliest known *H. sapiens* in Europe. "Someone in the last Ice Age," Solecki wrote, "must have ranged the mountainside in the mournful task of collecting flowers for the dead." Furthermore, Solecki continued, "It seems logical to us today that pretty things like flowers should be placed with the cherished dead, but to find flowers in a Neanderthal burial that took place about 60,000 years ago is another matter." Skeletons showed evidence of injuries tended and healed—indications that the sick and wounded had been cared for. Solecki's attitude toward them was encapsulated in the title of his 1971 book, *Shanidar: The First Flower People.*

Ongoing studies of Neanderthal skeletons unearthed in Iraq during the 1950s suggest the existence of a more complex social structure than previously thought (above left: artist's rendering of a burial ritual; above right: deep cut to one individual's rib may indicate a fatal assault).

KAREN CARR; CHIP CLARK / NMNH, SI

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Drawing on Solecki's research, writer Jean Auel mixed fiction and archaeology in her novel, *The Clan of the Cave Bear*, a 1980 bestseller that humanized, if not glamorized, Neanderthals. In the book, the clan members adopt an orphaned Cro-Magnon child, who comprehends things beyond their ken, foreshadowing the Neanderthals' fate. Outcompeted by the Cro-Magnon, Neanderthals would become extinct.

According to Potts, climate change was the instrument of their demise. Around 33,000 years ago, the Neanderthal, who migrated south from their northernmost range in Central Europe as glaciers advanced, settled in the wooded regions of Iberia (present-day Spain and Portugal) and Gibraltar. There, they flourished, possibly until 28,000 years ago, when they were supplanted by a supremely adaptable competitor—the resilient Cro-Magnon.

Cro-Magnon groups, says Potts, who were "aided by their ability to make warmer, more form-fitting clothing, had already moved into the Neanderthals' former territories." Thus, Potts adds, "Modern humans gained a foothold they never relinquished." The Neanderthals lived in ever smaller and more isolated areas—suffering what we now call loss of habitat—eventually vanishing from the earth.

"The Neanderthals were smart," Potts says. "They had brains the same size as Cro-Magnon and were very clever at using local resources. They lacked the ability to expand their thinking and adapt to changing conditions."

Shanidar 3's own story, however, is grounded not in large evolutionary forces but in particular circumstances. "There is quite a severe and deep cut to a rib on [Shanidar 3's] left side," says Potts. "This cut would have been deep enough to collapse his lung, so Shanidar 3 is the oldest known individual who could have been murdered."

OWEN EDWARDS *is a freelance writer and author of the book* Elegant Solutions.

Q&A

In 1996, Smithsonian anthropologist **RICK POTTS**, director of the Human Origins Program at the Natural History Museum, turned heads in scientific circles when he proposed that climate change was the driving force in human evolution. He spoke with the magazine's Beth Py-Lieberman.

Conventional wisdom has long posited that African forests became grasslands, prompting our ancestors to climb down from trees, walk upright and use tools. That theory doesn't work for you?
As I delved into the scientific data concerning ancient climate, I began to see fluctuations—between wet and dry, warm and cool—as a very important signal that other researchers seemed to be missing.

So, our early ancestors didn't live only in arid grasslands?
For the first four million years of human evolution our ancestors walked upright but also retained very long, powerful arms and relatively short legs—which indicates they were still very comfortable climbing in trees. This suggests that the origin of our ability to walk on two legs was not just an adaptation to grasslands but rather an adaptation to the tendency of the environment to switch back and forth, between landscapes with many trees and very few.

Is there other evidence for this adaptation?
Lots of evidence. For instance, we can now look at stone tools in an entirely different light. A simple sliver of rock is a knife sharper than a carnivore's canine tooth, while a hammer stone can pound and crush as effectively as an elephant's molar. The aptitude to create such a diversity of tools suggests an ability to adapt to changing surroundings and eat many different kinds of food.

How does your theory fit with the "survival of the fittest" idea?
"Survival of the fittest" means that there is a particular kind of challenge that is consistent over long periods of time. Traditionally, scientists judge an organism as "fit" based upon its ability to survive and reproduce better than other organisms in a specific environment. But you can't have survival of the fittest when the definition of "fittest" keeps changing, based upon fluctuations in the climate. I prefer to think of human evolution as "survival of the versatile."

How will versatility benefit humanity as it confronts global climate change?
The rate of global climate change poses a serious challenge today. I'm especially concerned about the element of instability, which causes uncertainty about precisely how we should respond. But I'm actually quite optimistic about our future. By virtue of our evolutionary history, we have amazing social abilities—the ability to help one another, the ability to innovate technologically and the ability to change our minds and build new understandings of the world. Those traits have never existed in any other organism, including our early ancestors.

Read more of our interview with Rick Potts at Smithsonian.com/potts

JASON NICHOLS

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What's Up

TIBETAN TREASURES

Opening March 13 at the Sackler Gallery, an exhibit of devotional Buddhist art dating from the 12th to 19th centuries showcases magnificent altarpieces and finely crafted sculptures of deities (left: the savior-goddess Tara).

ABOUT FACES

Portraitist Jim Torok says that learning personal details about his subjects —whether they're friends or strangers—allows him to paint more convincing likenesses (left: *Lorna*, 2000). Get face time at the Portrait Gallery through July 5.

ROCK OF AGES

Accompanying early survey teams, photographer Timothy H. O'Sullivan documented the untamed American West (right: *Witches Rocks*, 1869). An exhibit of his works is at American Art through May 9.

WIDE SPECTRUM

A multimedia show at the Hirshhorn Museum until February 2011 explores the use of color in the works of late-20th-century abstract artists (right: James Turrell's eerie light sculpture, *Milk Run*, 1996).

MICRO MACHINE

This itsy-bitsy, teeny-weeny yellow Tata Nano is on view at the Cooper-Hewitt until April 25. Made in India, the five-foot-wide car has been likened to the Model T because of its affordable, $2,200 base price.

BY JESSE RHODES

VISIT THE SMITHSONIAN For a free Associates' planning packet, call 202 633-1000 or 202 357-1729 (TTY), 9 a.m. to 5 p.m. Monday through Friday and 9 a.m. to 4 p.m. Saturday. Or send an e-mail to info@si.edu. The Smithsonian Information Center in the Castle is open daily, 8:30 a.m. to 5:30 p.m. Members can visit the reception desk between 9 a.m. and 4 p.m. to register for a behind-the-scenes tour and to hear about membership benefits. Most museums are open daily, 10 a.m. to 5:30 p.m. All museums are closed December 25.

SACKLER GALLERY, SI; NPG, SI; SAAM; HIRSHHORN MUSEUM, SI; COOPER-HEWITT MUSEUM, SI

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18. Death on Display VI—Christian Martyrdom
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26. Imperial Arches, Columns, and Monuments
27. Imperial Baths in Rome—Spas for the Masses
28. Roman Engineering—Linking the World
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30. Images of Warfare—Roman Military Monuments
31. Roman Colonies—Small Romes
32. Local Baths and Roman Bathing Culture
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34. Putting It All Together I—A Day in Pompeii
35. Putting It All Together II—A Day in Rome
36. Conclusions and the Images of Empire

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Wrecking History

A 1,000-year-old city in northwest China, Kashgar was a vital stop on the ancient Silk Road. Why is the government now demolishing its oldest neighborhoods, home to the fiercely independent Uighur people?

BY JOSHUA HAMMER

PHOTOGRAPHS BY MICHAEL CHRISTOPHER BROWN

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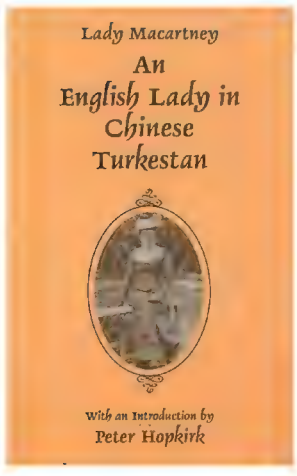
If destruction continues unimpeded, preservationists will run out of time to save Kashgar's Uighur quarter (where new construction flanks ancient mosques). "If nothing is done," says Beijing-based preservationist Hu Xinyu, "next year this [Old City] will be gone."

THE SECOND-STORY ROOMS OF THE CENTURIES-OLD MUD-BRICK HOUSES WERE cantilevered atop log beams and nearly touched each other across an alleyway paved with hexagonal stones. Women wearing dark veils leaned out of tiny windows. Poplar doors, painted bright blue or green and adorned with brass floral petals, stood half open—a subtle signal that the master of the house was inside. The aromas of freshly baked bread and ripe peaches wafted up from vendors' wooden carts.

It was early morning and I was exploring the back streets of Kashgar, a fabled city on the western edge of China, with a Chinese journalist from Beijing, whom I'll identify only as Ling, and a young handicraft salesman from Kashgar, whom I'll call Mahmati. Mahmati is a Uighur (WEE-goor), a member of the ethnic minority that makes up 77 percent of the Kashgar population. He had traveled to Beijing before the 2008 Olympics to take advantage of the tourist influx and had stayed on. I'd invited him to accompany me to Kashgar to act as my guide to one of the best-preserved—and most endangered—Islamic cities in Central Asia.

The three of us followed narrow passageways bathed in sunlight or obscured by shadows. We encountered faces that testified to Kashgar's role as a crossroads of Central Asia on the route linking China, India and the Mediterranean. Narrow-eyed, white-bearded elders wearing embroidered skullcaps chatted in front of a 500-year-old mosque. We passed pale-complexioned men in black felt hats; broad-faced, olive-skinned men who could have passed for Bengalis; green-eyed women draped in head scarfs and chadors; and the occasional burqa-clad figure who might have come straight from Afghanistan. It was a scene witnessed in the early 1900s by Catherine Theodora Macartney, wife of the British consul in Kashgar when it was a listening post in the Great Game, the strategic Russia-Britain conflict for control of Central Asia. "One could hardly say what the real Kashgar type was," she wrote in a 1931 memoir, *An English Lady in Chinese Turkestan*, "for it has become so mixed by the invasion of other people in the past."



We rounded a corner and stared into a void: a vacant lot the size of four football fields. Mounds of earth, piles of mud bricks and a few jagged foundations were all that remained of a once-lively neighborhood. "My God, they are moving so fast," Mahmati said. A passerby pointed to a row of houses at the lot's edge. "This is going next," he told us. Nearby, a construction team had already laid out the steel and concrete foundations of a high-rise and was dismantling the surrounding buildings with mallets and chisels. The men stood on ladders, filling the air with dust. A red banner announced the quarter would be rebuilt with "true care from the [Communist] Party and the government."

FOR MORE THAN A THOUSAND YEARS, Kashgar—where the bone-dry Taklamakan Desert meets the Tian Shan Mountains—was a key city along the Silk Road, the 7,000-mile trade route that connected China's Yellow River Valley with India and the Mediterranean. In the ninth century, Uighur forebears, traders traveling from Mongolia in camel caravans, settled in oasis towns around the desert. Originally Buddhists, they began converting to Islam about 300 years later. For the past 1,000 years, Kashgar has thrived, languished—and been ruthlessly suppressed by occupiers. The Italian adventurer Marco Polo reported passing through around 1273, about 70 years after it was seized by

While Uighur culture endures in the Old City (below: a teahouse), urban renewal (opposite: in Kashgar's central plaza, posters herald building projects) threatens the fabric of traditional life at a fabled crossroads (map). "The destruction of the Old City," says British author and journalist Christian Tyler, is "devastating for the history and culture" of Kashgar.

LEFT: OXFORD UNIVERSITY PRESS

MAP: GUILBERT GATES

Genghis Khan. He called it "the largest and most important" city in "a province of many towns and castles." Tamerlane the Great, the despot from what is now Uzbekistan, sacked the city in 1390. Three imperial Chinese dynasties conquered and reconquered Kashgar and its environs.

Still, its mosques and madrassahs drew scholars from all over Central Asia. Its caravansaries, or inns, provided refuge to traders bearing glass, gold, silver, spices and gems from the West and silks and porcelain from the East. Its labyrinthine alleys teemed with blacksmiths, cotton-spinners, book-binders and other craftsmen. Clarmont Skrine, a British envoy writing in 1926, described looking out on "the vast horizon of oasis and desert, of plains and snowy ranges. . . . How remote and isolated was the ancient land to which we had come!" In 2007, Hollywood director Marc Forster used the city as the stand-in for 1970s Kabul in his film of Khaled Hosseini's best-selling novel about Afghanistan, *The Kite Runner.*

The Uighurs have experienced tastes of independence. In

1933, they declared the East Turkestan Republic, from the Tian Shan Mountains south to the Kunlun Mountains, which lasted until a Chinese warlord came to power the next year. Then, in 1944, as the nationalist Chinese government neared collapse during World War II, the Uighurs established the Second East Turkestan Republic, which ended in 1949, after Mao Zedong took over China. Six years after Mao's victory, China created the Xinjiang Uighur Autonomous Region, similar to a province but with greater local control; the Uighur Muslims are its largest ethnic group.

In the 1990s, the Chinese government built a railway to Kashgar and made cheap land available to Han Chinese, the nation's majority. Between one million and two million Han settled in Xinjiang during the past two decades, though Kashgar and other towns on the southern edge of the Taklamakan Desert are still predominately Uighur. "Xinjiang has always been a source of anxiety for the central power in Beijing, as is Tibet and Taiwan," Nicholas Bequelin, a Hong Kong-based Uighur expert at Human Rights Watch told me. "Historically the response to that is to assimilate the territory, particularly through the immigration of Han Chinese." The Han influx stirs resentment. "All construction and factory jobs around Kashgar have been taken by Han Chinese," says British journalist Christian Tyler, author of *Wild West China: The Taming of Xinjiang*. "The people in charge are Han, and they recruit Han. Natural resources—oil and gas, precious metals—are being siphoned off for benefit of the Han."

Now the Chinese government is doing to Kashgar's Old City what a succession of conquerors failed to accomplish: leveling it. Early in 2009 the Chinese government announced a $500 million "Kashgar Dangerous House Reform" program: over the next several years, China plans to knock down mosques, markets and centuries-old houses—85 percent of the Old City. Residents will be compensated, then moved—some temporarily, others permanently—to new cookie-cutter, concrete-block buildings now rising elsewhere in the city. In place of the ancient mud-brick houses will come modern apartment blocks and office complexes, some adorned with Islamic-style domes, arches and other flourishes meant to conjure up Kashgar's glory days. The government plans to keep a small section of the Old City intact, to preserve "a museumized version of a living culture," says Dru Gladney, director of the Pacific Basin Institute at Pomona College and one of the world's foremost scholars of Xinjiang and the Uighurs.

The destruction, some say, is business-as-usual for a government that values development over preservation of traditional architecture and culture. In 2005, new construction in Beijing equaled the total in all of Europe, according to the Beijing Cultural Heritage Protection Center (BCHPC), a privately funded advocacy group. In the Chinese capital, one *hutong* (traditional alley) after another has been demolished in the name of progress. "The destruction of [Kashgar's] Old City is a bureaucratic reflex, a philistine approach," says Tyler. "It's devastating for the history and the culture."

Others believe the plan reflects a governmental bias against ethnic minorities. "The state does not really see anything of real value in indigenous culture," says Bequelin. "[The thinking is] it's good for tourism, but basically [indigenous people] cannot contribute to the modernity of society." Greed may also be a factor: because most residents of the Old City lack property rights, they can be pushed aside, Bequelin adds, giving developers unbridled opportunity for self-enrichment.

The Chinese government says the demolition is needed to fortify the Old City against earthquakes, the most recent of which struck the region in February 2003, killing 263 people and destroying thousands of buildings. "The entire Kashgar area is in a special area in danger of earthquakes," Xu Jianrong, Kashgar's deputy mayor, said recently. "I ask you: What country's government would not protect its citizens from the dangers of natural disaster?"

Until recently, Kashgar remained "remote and isolated," as a British official described it in 1926 (clockwise from top: Uighurs bring livestock to market; women wear head scarfs; a cloth merchant tallies sales). "One could hardly say what the real Kashgar type was," wrote a diplomat's wife in 1931.

Writer **JOSHUA HAMMER** *lives in Berlin.* **MICHAEL CHRISTOPHER BROWN** *travels the world on assignment.*

But many in Kashgar don't buy the government's explanation. They say officials carried out no inspection of the Old City's houses before condemning them and that most of those that collapsed in recent earthquakes were newly constructed concrete dwellings, not traditional Uighur homes. "These buildings were designed to withstand earthquakes, and used for many centuries," Hu Xinyu of the BCHPC said of the traditional architecture. He suspects the widespread demolition has a more sinister motive: to deprive the Uighurs of their main symbol of cultural identity. Others view the destruction as punishment for Uighur militancy. The flood of Han Chinese into Xinjiang energized a small Uighur secessionist movement; Uighur attacks against Chinese soldiers and police have occurred sporadically in recent years. The government may well see the Old City as a breeding ground for both Uighur nationalism and violent insurrection. "In their minds, these

mazelike alleyways could become a hotbed for terrorist activities," says Hu.

To halt the destruction, the BCHPC recently petitioned Unesco to add Kashgar to a list of Silk Road landmarks being considered for United Nations World Heritage status, which obliges governments to protect them. China conspicuously left Kashgar off the list of Silk Road sites the government submitted to Unesco. "If nothing is done today," says Hu, "next year this city will be gone."

LING, MAHMATI AND I HAD FLOWN southwest to Kashgar from Urumqi, an industrial city of 2.1 million now 80 percent Han Chinese. The China Southern Airways jet had ascended over a sea of cotton and wheat fields at the edge of Urumqi, crossed a rugged zone of crenelated canyons and translucent blue lakes, then soared over the Tian Shan Mountains—a vast, forbidding domain of black basalt peaks, many covered in snow and ice, rising to 20,000 feet—before setting down in Kashgar.

The three of us climbed nervously into a taxi in front of the tiny airport. A government notice posted in the taxi warned passengers to be vigilant against Uighur terrorists. "We should clear our eyes to distinguish between right and wrong," it advised in both Chinese and the Arabic script of the Uighur language (related to Turkish).

Two months earlier, on July 5, Uighur anger had erupted lethally in Urumqi, when Uighur youths went on a rampage, reportedly stabbing and beating to death 197 people and injuring more than 1,000. (The rioting began as a protest against the killings of two Uighur laborers by fellow Han workers in a southern China toy factory.) Rioting also broke out in Kashgar but was quickly put down. The government blamed the violence on Uighur secessionists and virtually cut off western Xinjiang from the outside world: it shut down the Internet, banned text messages and blocked outgoing international telephone calls.

Just outside the airport, we hit a massive traffic jam: the police had set up a roadblock and were checking identifications and searching every car headed into Kashgar. The tension was even more pronounced as we reached the city center. Truckloads of People's Liberation Army soldiers rumbled down wide boulevards, past an unsightly mélange of billboards, glass-and-steel banks, the high-rise headquarters of China Telecom and a concrete tower called the Barony Tarim Petroleum Hotel. More troops stood vigilant on sidewalks or ate their lunches in small clusters in People's Square, a huge plaza dominated by a 50-foot-high statue of Chairman Mao, one of the largest still standing in China.

We pulled into the Hotel Seman, an 1890 relic. Pink-and-green molded ceilings, Ottoman-style arched wall niches and dusty Afghan carpets lining dimly lit hallways evoked a distant era. In the late 19th and early 20th centuries, the Russian consulate was located here, lorded over by diplomat Nicholas Petrovsky, who kept 49 Cossack bodyguards. As Russia tried to extend its influence over the region, Petrovsky and his British

counterpart, Consul George Macartney, spent decades spying on each other. When the Chinese revolution that put an end to imperial rule and brought Sun Yat-sen to power reached Kashgar in 1912, violence broke out in the streets. "My one thought was that the children and I must be in clean clothes if we were to be murdered," Macartney's wife, Lady Catherine, wrote in her diary. "We all appeared at 4:30 a.m. as though we were going to a garden party, in spotless white!" (The family returned safely to England after departing China in 1918.)

The hotel's glory days were well behind it. In the dusty and empty lobby, a Uighur clerk in traditional brocade dress and head scarf handed us a blank hotel register—foreign visitors had nearly disappeared since the July violence in Urumqi. At a deserted Internet café, the proprietor reassured us that we were not totally incommunicado. "I have a nephew

BOTTOM LEFT: NG HAN GUAN / AP IMAGES

in Xian," he said. "I can fax him your message, and then he will send it over the Internet to where you want it to go."

TO TOUR THE BACK STREETS of the Old City, Mahmati, Ling and I took a taxi to the Kashgar River, the murky waterway that divides Kashgar, and climbed to a hive of mud-brick buildings hugging a hillside. As the din of the modern city dropped away, we turned a corner and entered a world of monochromatic browns and beiges, gloom and dust, mosques on nearly every corner (162 at last count) and the occasional motor scooter putt-putting though the alleys. A team of Chinese officials carrying briefcases and notepads squeezed past us in one lane. "Are you going out on a tourist excursion?" one of them, a middle-aged woman, asked, and Mahmati and Ling nodded nervously; both surmised the officials were taking a door-to-door survey of the neighborhood's families in anticipation of evicting them.

In an alley bathed in the perpetual shadow of vaulted archways, we fell into conversation with a man whom I'll call Abdul-

Tensions remain since Uighurs killed a reported 197 people this past July in Urumqi (opposite below: protesters confronted police during the violence). In Kashgar, rioting was put down (top: today, Chinese soldiers patrol there). The government may view the mazelike Uighur quarter (below) as "a hotbed for terrorist activities," says Hu Xinyu.

lah. A handsome figure with an embroidered cap, gray mustache and piercing green eyes, he was standing outside the bright green door to his home, chatting with two neighbors. Abdullah sells mattresses and clothing near the Id-Kah Mosque, the city's grandest. During the past few years, he told us, he had watched the Chinese government chip away at the Old City—knocking down the ancient 35-foot-high earthen berm that surrounded it, creating wide boulevards through dense warrens of homes, putting up an asphalt plaza in place of a colorful bazaar in front of the mosque. Abdullah's neighborhood was next. Two months before, officials told residents that they would be relocated in March or April. "The government says the walls are weak, it will not survive an earthquake, but it is absolutely strong enough," Abdullah told us. "We don't want to leave, it is history—ancient tradition. But we can't stop it."

He led us through the courtyard of his home, filled with drying laundry and potted roses, and up a rickety flight of stairs to a balustraded second-floor landing. I could reach out and practically touch the mottled tan house across the alley. I stood on the wooden balcony and took in the scene: head-scarfed women in a lushly carpeted salon on the ground floor; a group of men huddled behind a half-closed curtain just across the balcony. The men were Abdullah's neighbors who had gathered to discuss the eviction. "We don't know where we're going to be moved to, we have no idea," one of them told me. "Nobody here wants to move."

In Kashgar (left: a statue of Mao in a central square) the author's visit during a time of high tension between Han Chinese and Uighurs (above: a wedding anniversary fete) brought him quickly to the government's attention. Han police officers came to his hotel, asked to see his passport and insisted he delete a photograph of a collapsing Uighur house.

Another man weighed in: "They say they are going to rebuild the place better. Who designs it? Nothing is clear."

Abdullah said he was told that homeowners would be able to redesign their own dwellings and the government would pay 40 percent. But one of his neighbors shook his head. "It has never happened before in China," he said.

ONE EVENING, MAHMATI TOOK ME to a popular Uighur restaurant in Kashgar. Behind closed doors in a private room, he introduced me to several of his friends—Uighur men in their mid-20s. As a group they were angry about tight surveillance by Chinese security forces and inequalities in education, jobs and land distribution. "We have no power. We have no rights," a man I'll call Obul told me over a dinner of lamb kebabs and cabbage dumplings.

In 1997, Chinese troops in the Xinjiang town of Ghulja fired on protesting Uighur students waving the flags of East Turkestan, killing an unknown number. Then, following the 9/11 attacks, the Chinese persuaded the United States to list a secessionist group calling itself the East Turkestan Islamic Movement as a terrorist organization, claiming it had ties to Al Qaeda.

During the American-led offensive against the Taliban in Afghanistan in 2001, Pakistani bounty hunters captured 22 Uighurs on the Afghan-Pakistan border. The prisoners were turned over to the U.S. military, which incarcerated them at Guantanamo Bay, Cuba. The Bush administration eventually released five to Albania and four to Bermuda. Six were granted asylum on the South Pacific island of Palau this past October. Seven Uighurs remain at Guantanamo, with ongoing litigation about whether they can be released in this country. (The federal government has determined that they pose no threat to the United States.) The Supreme Court has agreed to take up the case.

Just before the 2008 Beijing Olympics, the Chinese government claims, two Uighurs driving a truck deliberately

slammed into a column of Chinese paramilitary police jogging through the streets of Kashgar, killing 16 of them. (Eyewitness accounts from foreign tourists cast doubt on whether this was intentional.) In the following days, a few explosives went off 460 miles south of Urumqi, in the city of Kuqa, presumably the work of Uighur nationalists. But, says Bequelin of Human Rights Watch, "these are small groups with no coordination, no international support. They have no access to weapons, no training." The Chinese cracked down on all Uighurs, shuttering Islamic schools and tightening security.

One of the men at dinner that night told me that after he went to Mecca for the hajj, the annual holy pilgrimage, in 2006, he was interrogated by Chinese intelligence agents and ordered to surrender his passport. "If you are a Uighur and you need a passport for business purposes, you must pay 50,000 yuan (about $7,500)," another dinner guest told me. Ling suggested that the Uighurs were partly to blame for their problems, saying they didn't value education and their children had suffered for it. Obul acknowledged the point, but said it was too late for reconciliation with the Han majority and the Chinese government. "For us," he said, "the most important word is 'independence.'"

IT DIDN'T TAKE LONG before I—as one of the few foreigners then visiting Kashgar—came to the attention of Chinese authorities. At about 9 p.m. on my second night in Kashgar, there was a knock on my hotel room door. I opened it to confront two uniformed Han police officers, accompanied by the hotel manager. "Let me see your passport," one officer said in English. He rifled through the pages.

"Your camera," he said.

I retrieved it from my knapsack and displayed the digital photographs one by one—scenes from the Sunday animal market, where Uighurs from rural Xinjiang meet to buy and sell donkeys, sheep, camels and goats; shots taken in the alleys of the Old City. Then I came to a picture of a half-collapsed house, mud walls sagging, tile roof disintegrating—belying the image of burgeoning prosperity that China projects to the world.

"Remove the picture," a police officer commanded.

"Excuse me?"

He tapped his finger on the screen.

"Remove it."

Shrugging, I deleted the photo.

Mahmati, meanwhile, had been taken to the first floor of the hotel for interrogation. At midnight, he called me on his cellphone to say, in a quavering voice, that he was being taken to Kashgar's security headquarters.

"It's because he is a Uighur," Ling said bitterly. "The Chinese single them out for special treatment."

It was long past midnight when Mahmati returned. The police had questioned him for two hours about his relationship with Ling and me and had asked him to account for all the time we had spent together. Then they made Mahmati provide names, addresses and phone numbers for every member of his family in Kashgar, and warned him not to enter the "forbidden area" again—apparently the part of the Old City not designated a tourist zone. "They demanded to know the real reason for our journey. But I didn't tell them anything," he said.

ON ONE OF OUR LAST DAYS in Kashgar, Mahmati, Ling and I took a government-licensed tour through a tiny section of the Old City—about 10 percent of it—for 30 yuan (about $4.40). Here was a glimpse of the sanitized future that the Chinese government apparently envisions: a Uighur woman clad in a green vest and long blue skirt led us past reconstructed houses adorned with clean ceramic tiles, handicraft shops and cafés offering Western-style food—a tidy, highly commercialized version of the Old City. She kept up a cheerful patter about the "warm relations" among "all of China's peoples."

But under Mahmati's gentle questioning, our guide began to express less charitable feelings toward the Chinese government. It had refused to allow her to wear a head covering on the job, she said, and had denied her permission to take breaks for prayer. I asked her whether the area we were walking through would be spared the wrecking ball. She looked at me and paused before answering. "If the customer asks, we are supposed to say it will not be destroyed," she finally answered, "but they will destroy it with everything else." For a moment she let her anger show. Then she composed herself and said goodbye. We left her standing on the street, below a banner that declared, in English: "Ancient residence, a slice of the real Kashgar."

OUR EA ANCES

How did ape-like creatures evolve into members of the human family? Research on fossil remains, including 4.4-million-year-old "Ardi," is leading to new insights into our origins

BY ANN GIBBONS

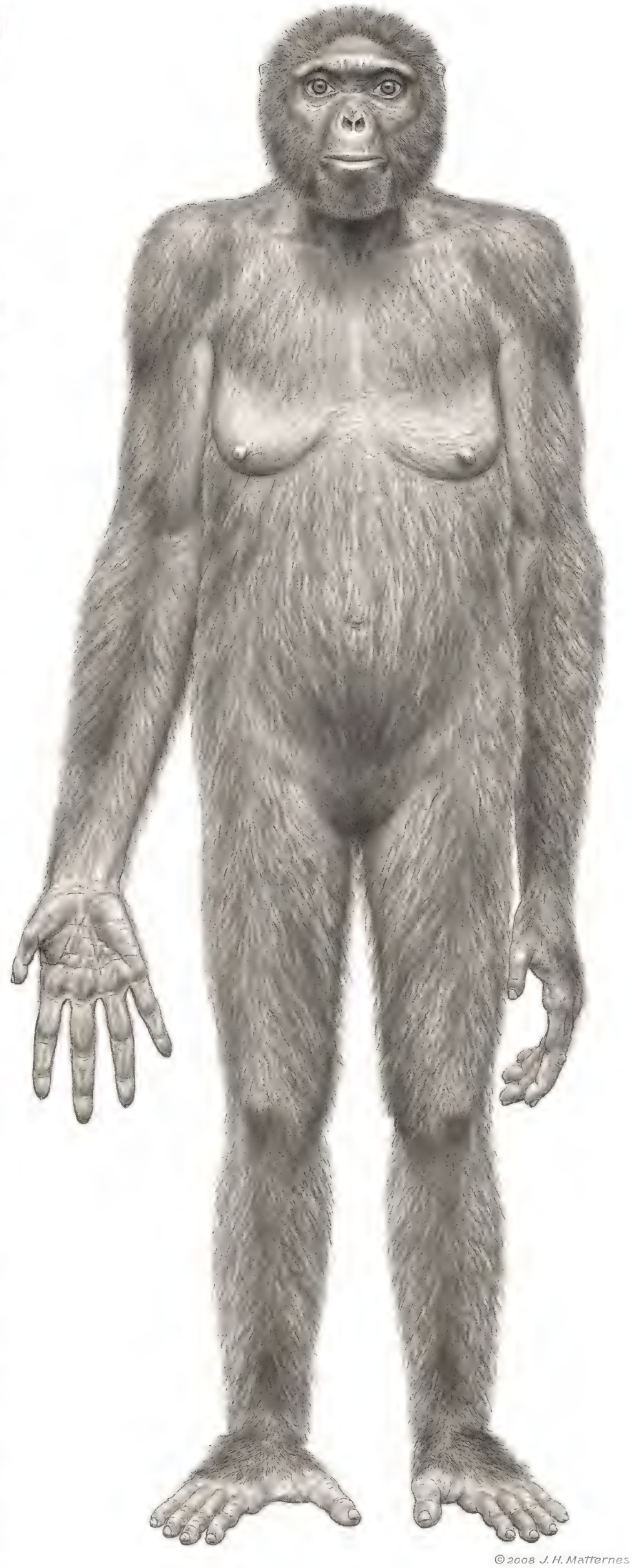
TIM WHITE IS STANDING WITH A GROUP OF RESTLESS men atop a ridge in the Afar desert of Ethiopia. A few of them are pacing back and forth, straining to see if they can spot fragments of beige bone in the reddish-brown rubble below, as eager to start their search as children at an Easter egg hunt. At the bottom of the hill is a 25-foot-long cairn of black rocks erected in the style of an Afar grave, so large it looks like a monument to a fallen hero. And in a way it is. White and his colleagues assembled it to mark the place where they first found traces, in 1994, of "Ardi," a female who lived 4.4 million years ago. Her skeleton has been described as one of the most important discoveries of the past century, and she is changing basic ideas about how our earliest ancestors looked and moved.

More than 14 years later, White, a wiry 59-year-old paleoanthropologist from the University of California at Berkeley, is here again, on an annual pilgrimage to see if seasonal rains have exposed any new bits of Ardi's bones or teeth. He often fires up the fossil hunters who work with him by chanting, "Hominid, hominid, hominid! Go! Go! Go!" But he can't let them go yet. Only a week earlier, an Alisera tribesman had threatened to kill White and two of his Ethiopian colleagues if they returned to these fossil beds near the remote village of Aramis, home of a clan of Alisera nomads. The threat is probably just a bluff, but White doesn't mess with the Alisera, who are renowned for being territorial and settling disputes with AK-47s. As a precaution, the scientists travel with six Afar regional police officers armed with their own AK-47s.

Arranging this meeting with tribal leaders to negotiate access to the fossil beds has already cost the researchers two precious days out of their five-week field season. "The best-laid plans change every day," says White, who has also had to deal with poisonous snakes, scorpions, malarial mosqui-

TIM WHITE (FROM *SCIENCE*, OCT. 2, 2009 ISSUE)

RLIEST
STORS



Ardi (right) lived in a forest in Africa. Her fossil skeleton (opposite) shows that she walked upright and yet had an opposable toe, good for climbing trees.

toes, lions, hyenas, flash floods, dust tornadoes, warring tribesmen and contaminated food and water. "Nothing in the field comes easy."

As we wait for the Alisera to arrive, White explains that the team returns to this hostile spot year after year because it's the only place in the world to yield fossils that span such a long stretch of human evolution, some six million years. In addition to Ardi, a possible direct ancestor, it is possible here to find hominid fossils from as recently as 160,000 years ago—an early *Homo sapiens* like us—all the way back to *Ardipithecus kadabba*, one of the earliest known hominids, who lived almost six million years ago. At last count, the Middle Awash project, which takes its name from this patch of the Afar desert and includes 70 scientists from 18 nations, has found 300 specimens from seven different hominid species that lived here one after the other.

Ardi, short for *Ardipithecus ramidus*, is now the region's best-known fossil, having made news worldwide this past fall when White and others published a series of papers detailing her skeleton and ancient environment. She is not the oldest member of the extended human family, but she is by far the most complete of the early hominids; most of her skull and teeth as well as extremely rare bones of her pelvis, hands, arms, legs and feet have so far been found.

With sunlight beginning to bleach out the gray-and-beige terrain, we see a cloud of dust on the horizon. Soon two new Toyota Land Cruisers pull up on the promontory, and a half-dozen Alisera men jump out wearing Kufi caps and cotton sarongs, a few cinched up with belts that also hold long, curved daggers. Most of these clan "elders" appear to be younger than 40—few Alisera men seem to survive to old age.

After customary greetings and handshaking, White gets down on his hands and knees with a few fossil hunters to show

J.H. MATTERNES

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the tribesmen how the researchers crawl on the ground, shoulder to shoulder, to look for fossils. With Ethiopian paleoanthropologist and project co-leader Berhane Asfaw translating to Amharic and another person translating from Amharic to Afariña, White explains that these stones and bones reveal the ancient history of humankind. The Alisera smile wanly, apparently amused that anyone would want to grovel on the ground for a living. They grant permission to search for fossils—for now. But they add one caveat. Someday, they say, the researchers must teach them how to get history from the ground.

Tim White (gesturing to Alisera men) has to deal with drought, disease and armed villagers to conduct research.

THE QUEST FOR FOSSILS OF HUMAN ANCESTORS BEGAN in earnest after Charles Darwin proposed in 1871, in his book *The Descent of Man and Selection in Relation to Sex*, that humans probably arose in Africa. He didn't base his claim on hard evidence; the only hominid fossils then known were Neanderthals, who had lived in Europe less than 100,000 years ago. Darwin suggested that our "early progenitors" lived on the African continent because its tropical climate was hospitable to apes, and because anatomical studies of modern primates had convinced him that humans were more "allied" with African apes (chimpanzees and gorillas) than Asian apes (orangutans and gibbons). Others disagreed, arguing that Asian apes were closer to modern humans.

As it happened, the first truly ancient remains of a hominid—a fossilized skullcap and teeth more than half a million years old—were found in Asia, on the island of Java, in 1891. "Java man," as the creature was called, was later classified as a member of *Homo erectus*, a species that arose 1.8 million years ago and may have been one of our direct ancestors.

So began a century of discovery notable for spectacular finds, in which the timeline of human prehistory began to take shape and the debate continued over whether Asia or Africa was the human birthplace.

In 1924, the Australian anatomist Raymond Dart, looking through a crate of fossils from a limestone quarry in South Africa, discovered a small skull. The first early hominid from Africa, the Taung child, as it was known, was a juvenile member of *Australopithecus africanus*, a species that lived one million to two million years ago, though at the time skeptical scientists said the chimpanzee-size braincase was too small for a hominid.

In 1959, archaeologist Louis Leakey and his wife Mary, working in Olduvai Gorge in Tanzania, discovered a bit of hominid jawbone that would later become known as *Paranthropus boisei.* The 1.75-million-year-old fossil was the first of many hominids the Leakeys, their son Richard and their associates would find in East Africa, strengthening the case that hominids indeed originated in Africa. Their work inspired American and European researchers to sweep through the Great Rift Valley, a geologic fault that runs through Kenya, Tanzania and Ethiopia and exposes rock layers that are millions of years old.

In 1974, paleoanthropologists Donald Johanson and Tom Gray, digging in Hadar, Ethiopia, found the partial skeleton of the earliest known hominid at the time—a female they

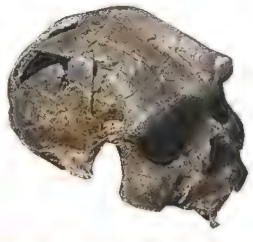
ANN GIBBONS

UNEARTHING OUR ROOTS

Fossil hunters have documented numerous ancient hominid species as they continue to plot the course

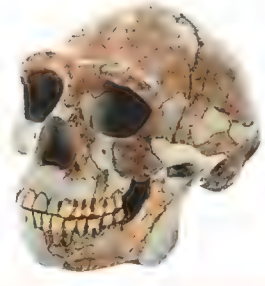
1856
First remains of Neanderthal man (*Homo neanderthalensis*) are found in a quarry in Germany

1891
Eugene Dubois discovers Java man (*Homo erectus*) cranium in Indonesia



1924
Raymond Dart discovers Taung child (*Australopithecus africanus*), the first hominid fossil to be found in Africa

1929
Davidson Black discovers Peking man (*Homo erectus*) fossils in a cave in Zhoukoudian, China



1850 1860 1870 1880 1890 1900 1920 1930 1940 1950

Paleoanthropologists have found evidence of seven different hominid species in the desert near Aramis (Yohannes Haile-Selassie, in cap, and Berhane Asfaw with *Ardipithecus ramidus* fossils). Millions of years ago, much of the region was lush woodland.

called Lucy, after the Beatles' song "Lucy in the Sky with Diamonds," which was playing in camp as they celebrated. At 3.2 million years old, Lucy was remarkably primitive, with a brain and body about the size of a chimpanzee's. But her ankle, knee and pelvis showed that she walked upright like us.

This meant Lucy was a hominid—only humans and our close relatives in the human family habitually walk upright on the ground. A member of the species *Australopithecus afarensis*, which lived from 3.9 million to 2.9 million years ago, Lucy helped answer some key questions. She confirmed that upright walking evolved long before hominids began using stone tools—about 2.6 million years ago—and *before* their brains began to expand dramatically. But her upright posture and gait raised new questions. How long had it taken to evolve the anatomy to balance on two feet? What prompted some ancient ape to stand up and begin walking down the path toward humanness? And what kind of ape was it?

Lucy, of course, couldn't answer those questions. But what came before her? For 20 years after her discovery, it was as if the earliest chapter of the human story were missing.

ONE OF THE FIRST TEAMS TO SEARCH FOR LUCY'S ancestor was the Middle Awash project, which formed in 1981 when White and Asfaw joined Berkeley archaeologist J. Desmond Clark to search for fossils and stone tools in Ethiopia. They got off to a promising start—finding 3.9-million-year-old fragments of a skull and a slightly younger thighbone—but they were unable to return to the Middle Awash until 1990, because Ethiopian officials imposed a moratorium on searching for fossils while they rewrote their antiquities laws. Finally, in 1992, White's graduate student, Gen Suwa, saw a glint in the desert near Aramis. It was the root of a tooth, a molar, and its size and shape indicated that it belonged to a hominid. Suwa and other members of the Middle Awash project soon collected other fossils, including a child's lower jaw with a milk molar still attached. State-of-the-art dating methods indicated that they were 4.4 million years old.

The team proposed in the journal *Nature* in 1994 that the fossils—now known as *Ardipithecus ramidus*—represented the "long-sought potential root species for the Hominidae," meaning that the fossils belonged to a new species of ho-

MAP: GUILBERT GATES; TIM WHITE / BRILL ATLANTA

of human evolution

1959
Mary Leakey discovers the first ancient hominid in East Africa—a *Paranthropus boisei* skull in Tanzania

1960
Leakeys discover *Homo habilis* jaw and hand bones in Tanzania—the first direct ancestor of humans found in Africa

1974
Donald Johanson finds Lucy (*Australopithecus afarensis*) in Ethiopia

1994
Yohannes Haile-Selassie and the Middle Awash project uncover first fossils of "Ardi" (a member of *Ar. ramidus*), the oldest known hominid skeleton

1994
Meave Leakey's team discovers *Australopithecus anamensis* in Kenya, the direct ancestor of *Au. afarensis*

1992
Gen Suwa, Tim White and the Middle Awash project uncover first fossils of the species *Ardipithecus ramidus* in Ethiopia

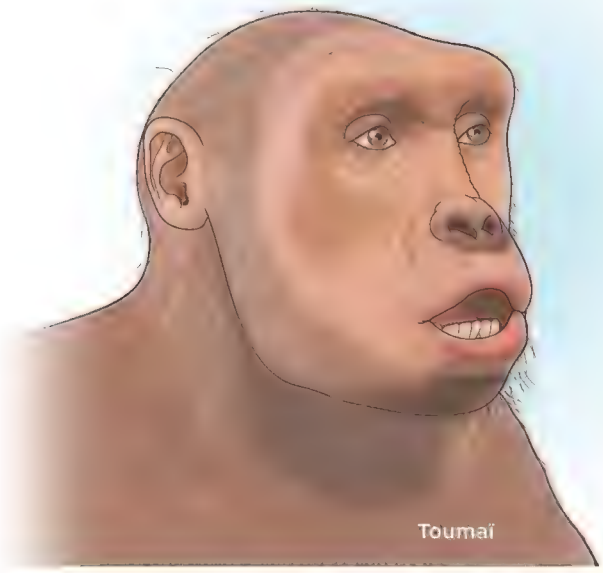
1997
Yohannes Haile-Selassie and the Middle Awash project find *Ardipithecus kadabba*, a species predating Ardi

2000
Martin Pickford and Brigitte Senut's team find remains of *Orrorin tugenensis* in Kenya

2001
Michel Brunet's team finds fossils of oldest known hominid, in Chad, the Toumaï cranium (*Sahelanthropus tchadensis*)

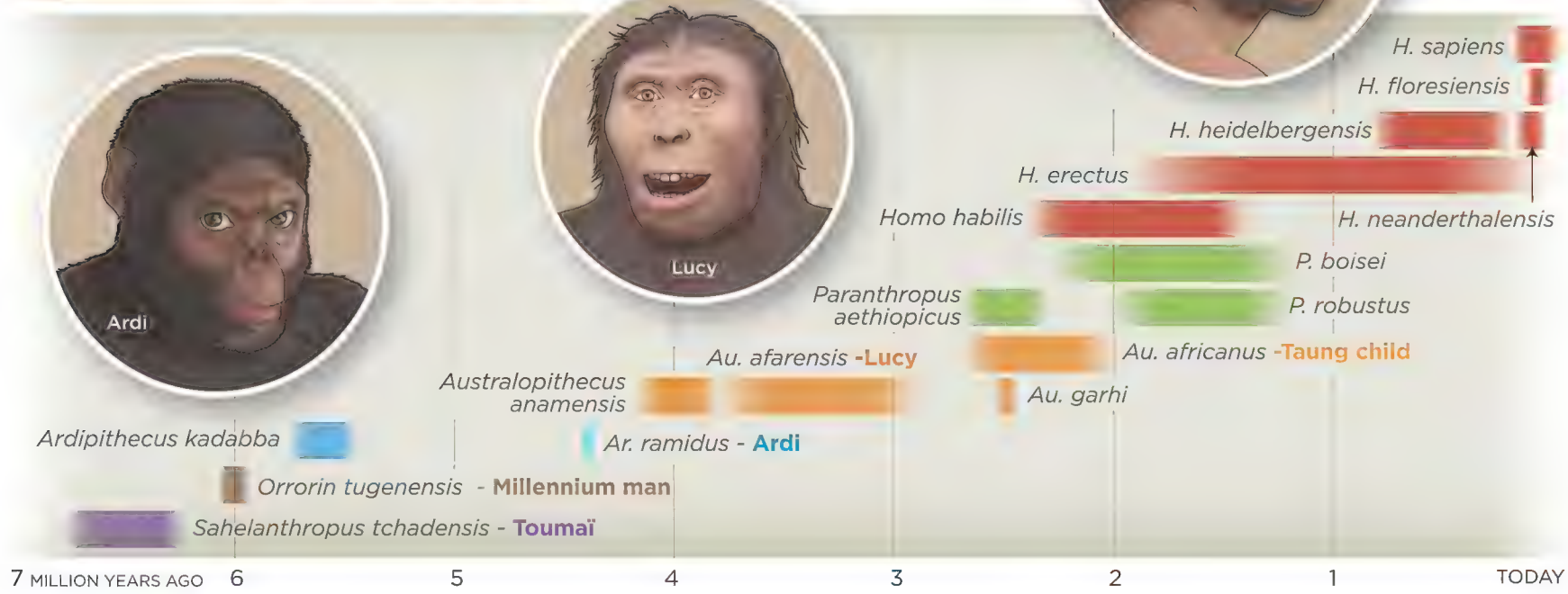
1960 1970 1980 1990 2000 2010

TIMELINE (CHRONOLOGICAL): MICHAEL KOLVENBACH / ACTION PRESS / ZUMA PRESS; PASCAL GOETGHELUCK / PHOTO RESEARCHERS, INC.; JOHN READER / PHOTO RESEARCHERS, INC.; DAVID L. BRILL; DES BARTLETT / PHOTO RESEARCHERS, INC.; BETTMANN / CORBIS; J.H. MATTERNES; TIM WHITE / BRILL ATLANTA; FUTOSHI MORI; PATRICK ROBERT / CORBIS



KEY HUMAN SPECIES

Hominid evolution produced many species. Some overlapped in time. All but one—*Homo sapiens*, us—ended in extinction. This chart shows roughly when some of the known species in the human family lived. Like-colored bars denote closely related species. *H. sapiens* may be a direct descendant of *H. erectus.*



minid that could have given rise to all later hominids. The idea that it was a member of the human family was based primarily on its teeth—in particular, the absence of large, dagger-like canines sharpened by the lower teeth. Living and extinct apes have such teeth, while hominids don't. But the gold standard for being a hominid was upright walking. So was *A. ramidus* really a hominid or an extinct ape?

White joked at the time that he would be delighted with more fossils—in particular, a skull and thighbone. It was as if he had placed an order. Within two months, another graduate student of White's, Ethiopian paleoanthropologist Yohannes Haile-Selassie, spotted two pieces of a bone from the palm of a hand—their first sign of Ardi. The team members eventually found 125 pieces of Ardi's skeleton. She had been a muscular female who stood almost four feet tall but could have weighed as much as 110 pounds, with a body and brain roughly the same size as a chimpanzee's. As they got a good look at Ardi's body plan, they soon realized that they were looking at an entirely new type of hominid.

It was the find of a lifetime. But they were daunted by Ardi's condition. Her bones were so brittle that they crumbled when touched. White called them "road kill."

The researchers spent three field seasons digging out entire blocks of sedimentary rock surrounding the fossils, encasing the blocks in plaster and driving them to the National Museum of Ethiopia in Addis Ababa. In the museum lab, White painstakingly injected glue from syringes into each fragment and then used dental tools and brushes, often under a microscope, to remove the silty clay from the glue-hardened fossils. Meanwhile, Suwa, today a paleoanthropologist at the University of Tokyo, analyzed key fossils with modified CT scanners to see what was inside them and used computer imaging to digitally restore the crushed skull. Finally, he and anatomist C. Owen Lovejoy worked from the fossils and the computer images to make physical models of the skull and pelvis.

It's a measure of the particularity, complexity and thoroughness of the researchers' efforts to understand Ardi in depth that they took 15 years to publish their detailed findings, which appeared this past October in a series of 11 papers in the journal *Science.* In short, they wrote that Ardi and fossils from 35 other members of her species, all found in the Middle Awash, represented a new type of early hominid that wasn't much like a chimpanzee, gorilla or a human. "We have seen the ancestor and it's not a chimpanzee," says White.

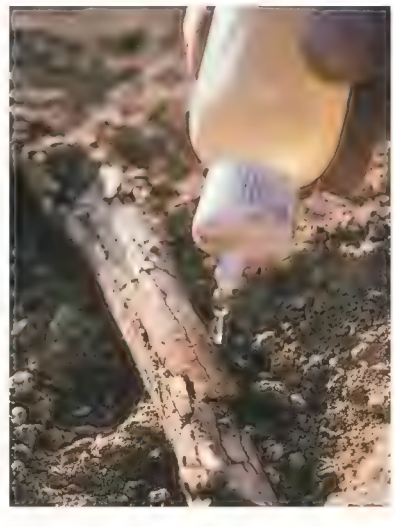
This came as a surprise to researchers who had proposed that the earliest hominids would look and act a lot like chimpanzees. They are our closest living relatives, sharing 96 percent of our DNA, and they are capable of tool use and complex social behavior. But Ardi's discoverers proposed that chimpanzees have changed so dramatically as they have evolved over the past six million years or so, that today's chimpanzees make poor models for the last common ancestor we shared.

ANN GIBBONS *is a correspondent for* Science *and the author of* The First Human: The Race to Discover Our Earliest Ancestors.

ILLUSTRATIONS: PEDRO VELASCO / SW INFOGRAPHICS

Hunting for hominid fossils (above: in Ethiopia), researchers "collect every piece of bone, every piece of wood, every seed," says White. And they take care with the remains (below: adding glue-like preservative to a 4.4-million-year-old *A. ramidus* tibia).

In his lab at Kent State University, Lovejoy recently demonstrated why Ardi is so unusual. He gently lined up four bones from Ardi's hand on his lab bench, and he showed how they fit together in a way that allowed Ardi's hand to bend far backward at the wrist. By comparison, a chimpanzee's wrist is stiff, which allows the animal to put its weight on its knuckles as it moves on the ground—knuckle walking. "If you wanted to evolve Ardi's hand, you couldn't do it from this," he said, waving a set of bones from a chimpanzee hand in the air. If Lovejoy is right, this means Ardi—and our upright-walking ancestors—never went through a knuckle-walking stage after they came down from the trees to live on the ground, as some experts have long believed.



As evidence that Ardi walked upright on the ground, Lovejoy pointed to a cast of her upper pelvic blades, which are shorter and broader than an ape's. They would have let her balance on one leg at a time while walking upright. "This is a monstrous change—this thing has been a biped for a very long time," Lovejoy said.

But Ardi didn't walk like us or, for that matter, like Lucy either. Ardi's lower pelvis, like a chimpanzee's, had powerful hip and thigh muscles that would have made it difficult to run as fast or as far as modern humans can without injuring her hamstrings. And she had an opposable big toe, so her foot was able to grasp branches, suggesting she still spent a lot of time in the trees—to escape predators, pick fruit or even sleep, presumably in nests made of branches and leaves. This unexpected combination of traits was a "shocker," says Lovejoy.

He and his colleagues have proposed that Ardi represents an early stage of human evolution when an ancient ape body plan was being remodeled to live in two worlds—in the trees and on the ground, where hominids increasingly foraged for plants, eggs and small critters.

The Ardi research also challenged the long-held views that hominids evolved in a grassy savanna, says Middle Awash project geologist Giday WoldeGabriel of Los Alamos National Laboratory. The Ardi researchers' thorough canvassing—"You crawl on your hands and knees, collecting every piece of bone, every piece of wood, every seed, every snail, every scrap," White says—indicates that Ardi lived in woodland with a closed canopy, so little light reached grass and plants on the forest floor. Analyzing thousands of specimens of fossilized plants and animals, as well as hundreds of samples of chemicals in sediments and tooth enamel, the researchers found evidence of such forest species as hackberry, fig and palm trees in her environment. Ardi lived alongside monkeys, kudu antelopes and peafowl—animals that prefer woodlands, not open grasslands.

Ardi is also providing insights into ancient hominid behavior. Moving from the trees to the ground meant that ho-

TIM WHITE; TIM WHITE / BRILL ATLANTA

minids became easier prey. Those that were better at cooperating could live in larger social groups and were less likely to become a big cat's next meal. At the same time, *A. ramidus* males were not much larger than females and they had evolved small, unsharpened canine teeth. That's similar to modern humans, who are largely cooperative, and in contrast to modern chimpanzees, whose males use their size to dominate females and brandish their dagger-like canines to intimidate other males.

As hominids began increasingly to work together, Lovejoy says, they also adopted other previously unseen behaviors—to regularly carry food in their hands, which allowed them to provision mates or their young more effectively. This behavior, in turn, may have allowed males to form tighter bonds with female mates and to invest in the upbringing of their offspring in a way not seen in African apes. All this reinforced the shift to life on the ground, upright walking and social cooperation, says Lovejoy.

Not everyone is convinced that Ardi walked upright, in part because the critical evidence comes from her pelvis, which was crushed. While most researchers agree that she is a hominid, based on features in her teeth and skull, they say she could be a type of hominid that was a distant cousin of our direct ancestor—a newfound offshoot on the human family tree. "I think it's solid" that Ardi is a hominid, if you define hominids by their skull and teeth, says Rick Potts, a paleoanthropologist at the Smithsonian's National Museum of Natural History. But, like many others who have not seen the fossils, he has yet to be convinced that the crushed but reconstructed pelvis proves upright walking, which could mean that Ardi might have been an extinct ape that was "experimenting" with some degree of upright walking. "The period between four million to seven million years is when we know the least," says Potts. "Understanding what is a great ape and what is a hominid is tough."

Ardi's species was cooperative, says C. Owen Lovejoy (examining fossil bones with Scott Simpson, left, at the National Museum of Ethiopia).

As researchers sort out where Ardi sits in the human family tree, they agree that she is advancing fundamental questions about human evolution: How can we identify the earliest members of the human family? How do we recognize the first stages of upright walking? What did our common ancestor with chimpanzees look like? "We didn't have much at all before," says Bill Kimbel, an Arizona State University paleoanthropologist. "*Ardipithecus* gives us a prism to look through to test alternatives."

AFTER ARDI'S DISCOVERY, RESEARCHERS NATURALLY BEGAN to wonder what came before her. They didn't have long to wait.

Starting in 1997, Haile-Selassie, now at the Cleveland Museum of Natural History, found fossils between 5.2 million and 5.8 million years old in the Middle Awash. A toe bone suggested its owner had walked upright. The bones looked so much like a primitive version of *A. ramidus* he proposed these fossils belonged to her direct ancestor—a new species he eventually named *Ardipithecus kadabba*.

In 2000, Martin Pickford of the College of France and Brigitte Senut of the National Museum of Natural History in Paris announced their team had found an even older hominid—13 fossils representing a species that lived six million years ago in the Tugen Hills of Kenya. Two of the fossils were thighbones, including one that provided the oldest direct evidence of upright walking in a hominid. They named this creature *Orrorin tugenensis*, drawing on a Tugen legend of the "original man" who settled the Tugen Hills. Informally, in honor of its year of discovery, they called it Millennium man.

Hot on the heels of that discovery came the most surprising one of all—a skull from Chad, about 1,500 miles west of the Great Rift Valley of eastern Africa where many of the most ancient hominids have been found. A Chadian student named Ahounta Djimdoumalbaye picked up a ball of rock on the floor of the Djurab Desert, where windstorms blow sand dunes like waves on a sea and expose fossils buried for millions of years. When Djimdoumalbaye turned over the stone, he stared into the vacant eye sockets of an ape-like face—the skull of a primate that lived six million to seven million years ago on the shores of an ancient lake. It had traits that suggested it was a hominid—a small lower face and canines and a skull that seemed to sit atop its spine, as in upright walkers. Paleontologist Michel Brunet, then of the University of Poitiers in France, introduced it as the oldest known hominid, *Sahelanthropus tchadensis*. (Its nickname is Toumaï, which means "hope of life" in the Goran language.) But proving that a skull walked upright is difficult, and questions linger about whether *Sahelanthropus* is a bona fide hominid or not.

Taken together, fossils discovered over the past 15 years have provided snapshots of several different creatures that were alive in Africa at the critical time when the earliest members of the human family were emerging. When these snapshots are added to the human family album, they double the time researchers can see back into our past—from Lucy at 3.2 million years to Toumaï at almost 7 million years.

One of the most sought-after fossils of that distant era was Lucy's direct ancestor. In 1994, 20 years after Lucy's skeleton was discovered, a team in Kenya led by Meave Leakey (the wife of Richard Leakey) found teeth and parts of a jaw as well as two pieces of shinbone that showed the

DAVID L. BRILL

Researchers long assumed early human ancestors were chimpanzee-like. But Ardi's comparatively flexible wrist (left to right: the hand of a modern human, Ardi and a chimp) points to a primate breakthrough: she did not walk on her knuckles, as chimps do.

creature walked upright. The fossils, named *Australopithecus anamensis*, were 4.1 million years old.

"This has been a fascinating 40 years to be in paleoanthropology," says Johanson, "one of the great times to be in this field." But, he adds, "there's still enormous confusion" about the murky time before 4 million years ago.

One thing that *is* clear is that these early fossils belong in a class by themselves. These species did not look or act like other known apes or like Lucy and other members of *Australopithecus*. They were large-bodied ground dwellers that stood up and walked on two legs. But if you watched them move, you would not mistake them for Lucy's species. They clung to life in the trees, but were poised to venture into more open country. In many ways, these early species resemble one another more than any fossils ever found before, as if there was a new developmental or evolutionary stage that our ancestors passed through before the transition was complete from ape to hominid. Indeed, when the skulls of Toumaï and Ardi are compared, the resemblance is "striking," says paleoanthropologist Christoph Zollikofer of the University of Zurich in Switzerland. The fossils are too far apart in time to be members of the same species, but their skulls are more like each other than they are like Lucy's species, perhaps signaling similar adaptations in diet or reproductive and social behavior.

The only way to find out how all these species are related to one another and to us is to find more bones. In particular, researchers need to find more overlapping parts of very early fossils so they can be compared directly—such as an upper end of a thighbone for both Ardi and Toumaï to compare with the upper thighbone of *O. tugenensis*.

AT ARAMIS, AS SOON AS THE CLAN LEADERS GAVE THE Middle Awash team their blessing, White began dispatching team members like an air traffic controller, directing them to fan out over the slope near Ardi's grave. The sun was high in the sky, though, making it hard to distinguish beige bone among the bleached out sediments. This time, the team found no new hominid fossils.

But one morning later that week, the team members drove up a dry riverbed to a site on the western margin of the Middle Awash. Only a few moments after hiking into the fossil beds, a Turkish postdoctoral researcher, Cesur Pehlevan, planted a yellow flag among the cobbles of the remote gully. "Tim!" he shouted. "Hominid?" White walked over and silently examined the molar, turning it over in his hand. White has the ability to look at a tooth or bone fragment and recognize almost immediately whether it belongs to a hominid. After a moment, he pronounced his verdict: "very good, Cesur. It's virtually unworn." The molar belonged to a young adult *A. kadabba*, the species whose fossils began to be found here in 1997. Now the researchers had one more piece to help fill in the portrait of this 5.8-million-year-old species.

"There's your discovery moment," said White. He reflected on the fossils they've bagged in this remote desert. "This year, we've got *A. kadabba*, *A. anamensis*, *A. garhi*, *H. erectus*, *H. sapiens*." That's five different kinds of hominids, most of which were unknown when White first started searching for fossils here in 1981. "The Middle Awash is a unique area," he said. "It is the only place on the planet Earth where you can look at the full scope of human evolution."

DAVID L. BRILL

THE NEW YORK PHILHARMONIC orchestra opened its historic first concert in Hanoi this past October with a lilting rendition of the Vietnamese national anthem, *Quoc ca Viet Nam* ("Armies of Vietnam, Forward"), followed by the more spirited strains of "The Star-Spangled Banner." Standing at attention for both in an atmosphere that can only be described as electric, the audience of fashionably dressed Vietnamese and a few Americans could hardly fail to sense both irony and respect as the once-bitter adversaries came together in the grandiose Hanoi Opera House built by the French in 1911.

Alan Gilbert, the Philharmonic's new music director, was later asked what he had been thinking as he was conducting. "Well, of course, getting it right for a pretty big moment," he said. "But also, I have to admit, there were a few mental flashes of pho."

For three days, Gilbert and I, separately and together, had scoured dozens of stalls lining both the broad avenues and the tight back alleys of Hanoi, seeking out versions of

The New York Philharmonic's Alan Gilbert (top: teaching at the Vietnam National Academy of Music) mixed music and meals with, among others, the author (middle: at the Hang Be market) and his mother, violinist Yoko Takebe (bottom). Pho (opposite) for lunch? Yes, at Hanoi's historic Sofitel Metropole hotel.

the lusty beef noodle soup that is Vietnam's national dish. We were joined intermittently by various orchestra members, including Gilbert's Japanese-born mother, Yoko Takebe, who has been a violinist with the Philharmonic for many years (as was his father, Michael Gilbert, until he retired in 2001). Between dodging motorbikes and cars that streamed unimpeded by stoplights—an amenity missing from the burgeoning capital—we slurped bowl after bowl of Vietnam's answer to Japan's ramen and China's lo mein.

In his travels, the 43-year-old maestro has become quite a food buff. When I learned that he planned to spend time between rehearsals and master classes seeking authentic pho on its native turf, I asked to tag along. Both of us were aware of the culinary rage pho has lately become in the United States, as Vietnamese restaurants flourish across the country—especially in Texas, Louisiana, California, New York and in and around Washington, D.C. The noodle-filled comfort food seems well suited to the current economy. (In the United States, you can get a bowl of pho for $4 to $9.) As a food writer,

Ultimate Pho

With more and more Americans sampling Vietnam's savory soup, a noted food critic and an esteemed maestro track down Hanoi's best

BY MIMI SHERATON

Pho, whether beef- or chicken-based, is a staple in streetside stalls (above) and restaurants (left). Hae-Young Ham (below), a violinist with the New York Philharmonic, also sampled *bun cha*, with pork meatballs, greens and noodles in less broth.

I've had an enduring obsession with food searches. They have taken me to obscure outposts, led to lasting friendships around the world and immersed me in local history and social customs.

And so it proved with pho, as Gilbert and I went about this throbbing, entrepreneurial city, admiring restored early-20th-century architectural landmarks built during the French protectorate, when the country was called Tonkin and the region was known as Indochina. Gilbert willingly agreed to an ambitious itinerary, which we punctuated with dueling wordplay—"Phobia," "It's what's pho dinner," "pho pas"—as we sought out the most authentic, beef-based *pho bo* or the lighter, chicken-based *pho ga*. Alas, our puns were based on the incorrect American pronunciation, "foe." In Vietnamese, it is somewhere between "fuh" and "few," almost like the French *feu*, for fire, as in *pot-au-feu*, and thereby hangs a savory shred of history.

We chopsticked our way through slim and slippery white rice noodles, green and leafy tangles of Asian basil, sawtooth coriander, peppermint, chives and fern-like cresses. For pho bo, we submerged slivers of rosy raw beef in the scalding soup to cook just milliseconds before we consumed them. Pho ga,

we discovered, is traditionally enriched with a raw egg yolk that ribbons out as it coddles in the hot soup. Both chicken and beef varieties were variously aromatic, with crisp, dry-roasted shallots and ginger, exotically subtle cinnamon and star anise, stingingly hot chilies, astringent lime or lemon juice and *nuoc mam*, the dark, fermented salty fish sauce that tastes, fortunately, better than it smells. It is that contrast of seasonings—sweet and spicy, salty, sour and bitter, hot and cool—that makes this simple soup so intriguing to the palate.

Gilbert gamely confronted bare, open-front pho stalls that had all the charm of abandoned carwashes and lowered his broad, 6-foot-1 frame onto tiny plastic stools that looked like overturned mop buckets. Nor was he fazed by the suspiciously unhygienic makeshift "kitchens" presided over by chatty, welcoming women who stooped over charcoal or propane burners as they reached into pots and sieves and balanced ladles of ingredients before portioning them into bowls.

In planning this adventure, I had found my way to the Web site of Didier Corlou (www.didiercorlou.com). A chef from Brittany who trained in France, he has cooked in many

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MIMI SHERATON *has been a food writer for over 50 years. She has written more than a dozen books, including the 2004 memoir* Eating My Words: An Appetite for Life.

JUSTIN MOTT / REDUX; CHRIS LEE / NEW YORK PHILHARMONIC (2); PP. 42 CHITOSE SUZUKI / AP IMAGES; CHRIS LEE / NEW YORK PHILHARMONIC (2); PP. 42-43 JUSTIN MOTT / REDUX

parts of the world and, having lived in Hanoi for the past 19 years, has become a historian of Vietnamese cuisine and its long-neglected native spices and herbs. Corlou and his wife, Mai, who is Vietnamese, run La Verticale, a casually stylish restaurant where he applies French finesse to traditional Vietnamese dishes and ingredients. I spent my first morning in Hanoi learning the ins and outs of pho while sipping Vietnamese coffee—a seductively sweet iced drink based on strong locally grown, French-brewed coffee beans and, improbably, syrupy canned condensed milk—in Corlou's fragrant, shelf-lined shop, where he sells customized spice blends. The shop provides entry to the restaurant.

Chef Corlou regards Vietnamese cuisine as one of the most original and interesting he has experienced; he values its ingenuity with humble products, its emphasis on freshness, the counterplay of flavors and the harmonious fusion of foreign influences, most notably from China and France. The pho we know today, he told me, began as a soup in and around Hanoi just a little over 100 years ago. "It is the single most important dish," he said, "because it is the basic meal of the people."

Pho bo is an unintended legacy of the French, who occupied Vietnam from 1858 to 1954 and who indeed cooked pot-au-feu, a soup-based combination of vegetables and beef, a meat barely known in Vietnam in those days and, to this day, neither as abundant nor as good as the native pork. (Corlou imports his beef from Australia.) But just as North American

"The most important part of the pho is the broth," says chef Didier Corlou (below middle), who trained in France and has lived in Hanoi for 19 years. "Because it takes so long to cook, it's difficult to make at home." While he calls the soup "the basic meal of the people," he and his wife serve haute versions at their upscale restaurant, La Verticale (map, above).

MAP: GUILBERT GATES; JUSTIN MOTT / REDUX

slaves took the leavings of kitchens to create what we now celebrate as soul food, so the Vietnamese salvaged leftovers from French kitchens and discovered that slow cooking was the best way to extract the most flavor and nourishment from them. They adopted the French word *feu*, just as they took the name of the French sandwich loaf, *pain de mie*, for *banh mi*, a baguette they fill with various greens, spices, herbs, sauces, pork and meatballs. Vietnam is perhaps the only country in the Far East to bake Western-style bread.

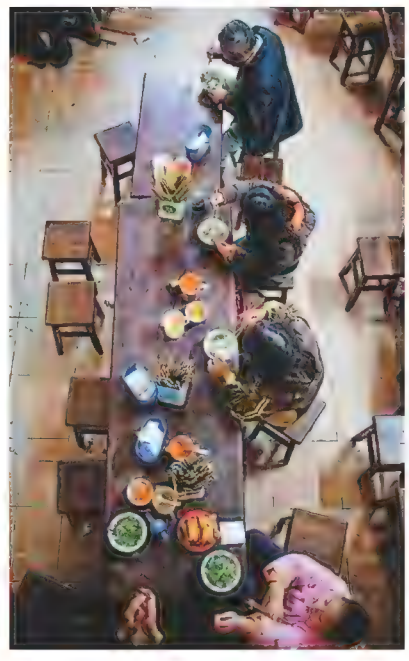
"The most important part of the pho is the broth," Corlou said, "and because it takes so long to cook, it's difficult to make at home. You need strong bones and meat—oxtail and marrow-filled shinbones—and before being cooked they should be blanched and rinsed so the soup will be very clear. And you must not skim off all of the fat. Some is needed for flavor."

The cooking should be done at an almost imperceptible simmer, or what cooks sometimes describe as a "smile." (One instruction advises that the soup simmer overnight for at least 12 hours, with the cook staying awake to add water lest the broth reduce too much.) Only then does one pay attention to the width (about a quarter-inch) of the flat, silky rice noodles, and to the combination of greens, the freshness of the beef and, finally, to the golden-brown knots of fried bread, all added just moments before the pho is served. Despite his stringent rules, Corlou is not against the variations of pho that come with distance from Hanoi; in Saigon, far to the south, it's closer to the pho usually found in the United States, sweetened with rock sugar and full of mung bean sprouts and herbs, both rarely seen in the north.

A tasting dinner that night at La Verticale included Philharmonic president Zarin Mehta and his wife, Carmen; Gilbert and his mother; pianist Emanuel Ax; and Eric Latzky, the orchestra's director of communications. We were served about a dozen French-Vietnamese creations, including two

haute phos, a rather mild one based on salmon with an astringent hint of coriander and another enriched with superb local foie gras, black mushrooms and crunchy cabbage.

The next day, Corlou guided a group of us through the teeming, winding aisles of the Hang Be market, close to willow-rimmed Hoan Kiem Lake, a habitat of Sunday strollers and early-morning practitioners of tai chi. He pointed out various fruits—among them seed-filled dragon fruit and russet, spiky-skinned rambutans—and introduced us to banana flowers, the pale mauve blossoms and creamy-white slivers of trunk shaved from newly sprouted banana trees. Dark gray, spotted snake-like fish swam in tanks, hard-shelled crabs writhed in their boxes, slices of pork sausages sizzled on grills and live rabbits and chickens plotted escapes from their cages. As lunchtime neared, market workers stretched out on cloths they draped over crates and mounds of produce and snoozed, their conical straw hats shielding their faces from light and flies. Hanging over all was the almost stifling fragrance of ripe tropical fruit, cut flowers and pungent spices, sharpened by the nose-twitching scents of nuoc mam sauce and medicinally sour-sweet lemon grass.



A restaurant chain (below) has pho in its name but not, it would seem, in its heart. Much better was the fare served at Pho Bat Dan's communal tables (left). Chuyen Bo (far left and below left), a stall in Hanoi's old quarter, offered a cornucopia of ingredients, including cuts of beef only the most adventurous Westerner would try. Customers who want pho-to-go get it in a plastic bag.

JUSTIN MOTT / REDUX (4)

In between pho hunts (right), Gilbert led the New York Philharmonic in its Vietnam debut at the Hanoi Opera House (above). He was concentrating on the moment, he later said, "but I have to admit there were a few mental flashes of pho."

I sought pho recommendations from United States Ambassador Michael W. Michalak and his wife, Yoshiko. During a reception for the orchestra at the U.S. Embassy, a villa in the 20th-century palatial style, they introduced us to Do Thanh Huong, a local pho buff who owns two fashion gift shops named Tan My. With her recommendations added to Corlou's, we expected easy success in our forays, and, when it came to pho ga, we had no problems.

But looking for pho bo at midday proved a mistake. Hungrier by the minute, we searched out such recommended pho redoubts as Pho Bo Ly Beo, Pho Bat Dan, Pho Oanh and Hang Var, only to find each shuttered tight. Thus we learned the hard way that the beefy broth is traditionally a breakfast or late-night dish, with shops opening between 6 and 8 a.m. and again around 9 or 10 at night.

The next day, Gilbert and I were disappointed by a pallid, salty and inept pho bo at a much-recommended branch of a slick, trendy Saigon chain, Pho24; we dubbed it McPho. For the rest of our days in Hanoi, we rose early to find excellent pho in the stalls that had been closed to us at lunch. We also discovered Spices Garden, a very good Vietnamese restaurant in the restored Sofitel Metropole Hanoi, the historic hotel once patronized by Graham Greene, W. Somerset Maugham and Charlie Chaplin. There a verdant, abundant pho bo is part of the lunchtime buffet (no surprise, since Didier Corlou was the chef at the hotel for 16 years, until 2007). On the second and final night of the Philharmonic's engagement, the audience included a large number of children whose parents had brought them to hear the Brahms Concerto in D major for Violin and Orchestra, with featured violinist Frank Peter Zimmermann. Tetsuji Honna, the Japanese music director of the Vietnam National Symphony Orchestra, explained to me that the violin is the most popular instrument for children in Asia to learn.

After the concert, Honna and one of his violinists, Dao Hai Thanh, invited me to try some late-night pho in the old quarter of Hanoi around Tong Duy Tan Street. Here young Vietnamese gather at long tables at a variety of stalls where meats and vegetables are cooked over table grills or dipped into hot pots of seething broth.

Our destination was Chuyen Bo, a pho stall with stools so low that Honna had to pile three atop one another for me to sit on. The choice of ingredients was staggering: not only eight kinds of greens, tofu, soft or crisp noodles, but also various cuts of beef—oxtail, brisket, shoulder, kidneys, stomach, tripe, lungs, brains—plus cooked blood that resembled blocks of chocolate pudding, a pale pink meat described to me as "cow's breast" (finally decoded as "udder") and a rather dry, sinewy-looking meat that one of the workers, pointing to his groin, said was "from a man." I was relieved to learn that the ingredient in question was a bull's penis. I opted instead for a delicious if conventional pho of oxtail and brisket. But later I worried that I had missed an opportunity. Perhaps udder and penis pho might have made a more stirring, not to mention memorable, finale to my quest. Maybe next time. Pho better or pho worse.

CHRIS LEE / NEW YORK PHILHARMONIC (2)

Watch what goes into making the classic Vietnamese soup at Smithsonian.com/pho

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DOLLEY MADISON SAVES

IN THE YEARS LEADING UP TO AMERICA'S second war with Britain, President James Madison had been unable to stop his penny-pinching secretary of the treasury, Albert Gallatin, from blocking Congressional resolutions to expand the country's armed forces. The United States had begun the conflict on June 18, 1812, with no Army worth mentioning and a Navy consisting of a handful of frigates and a fleet of gunboats, most armed with a single cannon. In 1811, Congress had voted to abolish Alexander Hamilton's Bank of the United States, making it nearly impossible for the government to raise money. Worst of all, the British and their European allies had engaged (and would ultimately defeat) Napoleon's France in battles across Europe in 1812 and 1813, which meant the United States would have to fight the world's most formidable army and navy alone.

In March 1813, Gallatin told the president, "We have hardly money enough to last till the end of the month." Along the Canadian border, American armies stumbled into ruinous defeats. A huge British naval squadron blockaded the American coast. In Congress, New Englanders sneered at "Mr. Madison's War," and the governor of Massachusetts refused to allow any of the state's militiamen to join the campaign in Canada. Madison fell ill with malaria and the aged vice president, Elbridge Gerry, grew so feeble that Congress began arguing about who would become president if both men died. The only good news came from victories over lone British warships by the tiny American Navy.

Dolley Madison's White House was one of the few places in the nation where hope and determination continued to flourish. Although she was born a Quaker, Dolley saw herself as a fighter. "I have always been an advocate for fighting when assailed," she wrote to her cousin, Edward Coles, in a May 1813 letter discussing the possibility of a British attack on the city. Spirits had risen when news of an American victory over the British frigate *Macedonian,* off the Canary Islands, reached the capital during a ball given in December 1812 to celebrate Congress' decision to enlarge the Navy at last. When a young lieutenant arrived at the ball carrying the flag of the defeated ship, senior naval officers paraded it

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PP. 50-51 THE MONTPELIER FOUNDATION (*DOLLEY MADISON DIRECTING THE RESCUE OF GEORGE WASHINGTON'S PORTRAIT, AUGUST 24, 1814* BY WILLIAM WOODWARD)

THE DAY

IN AUGUST 1814, WITH INVADING BRITISH SOLDIERS ONLY A FEW HOURS AWAY, THE FIRST LADY TOOK COMMAND OF THE WHITE HOUSE TO SAVE THE YOUNG NATION'S TREASURES

BY THOMAS FLEMING

around the floor, then laid it at Dolley's feet.

At social events, Dolley strived, in the words of one observer, "to destroy rancorous feelings, then so bitter between Federalists and Republicans." Members of Congress, weary of flinging curses at each other during the day, seemed to relax in her presence and were even willing to discuss compromise and conciliation. Almost all their wives and daughters were Dolley's allies. By day Dolley was a tireless visitor, leaving her calling cards all over the city. Before the war, most of her parties attracted about 300 people. Now attendance climbed to 500, and young people began calling them "squeezes."

As the British neared the White House (below: in 1814, before its torching), Dolley Madison directed that a Gilbert Stuart portrait of George Washington be removed. (Above: a 2009 mural recreates the scene.)

CORBIS

Dolley undoubtedly felt the stress of presiding over these crowded rooms. "My head is dizzy!" she confessed to a friend. But she maintained what an observer called her "remorseless equanimity," even when news was bad, as it often was. Critics heaped scorn on the president, calling him "Little Jemmy" and reviving the smear that he was impotent, underscoring the battlefield defeats over which he had presided. But Dolley seemed immune to such slander. And if the president looked as if he had one foot in the grave, Dolley bloomed. More and more people began bestowing a new title on her: first lady, the first wife of a U.S. president to be so designated. Dolley had created a semipublic office as well as a unique role for herself and those who would follow her in the White House.

She had long since moved beyond the diffidence with

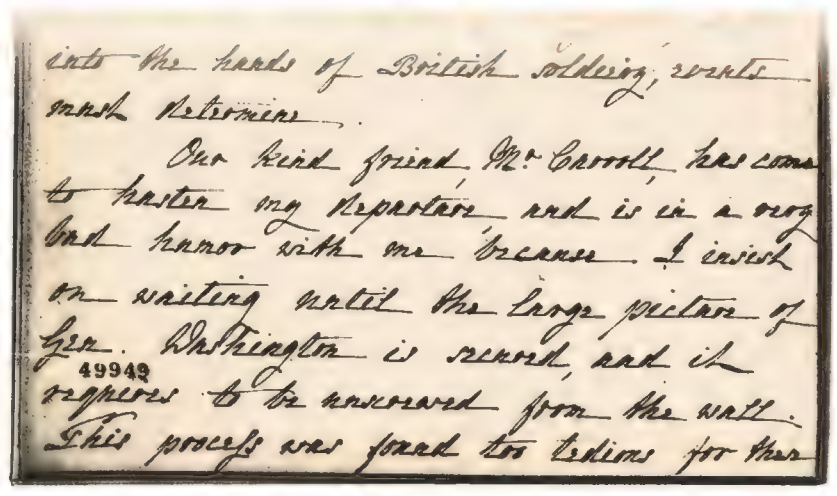
which she had broached politics in her letters to her husband nearly a decade before, and both had jettisoned any idea that a woman should not think about so thorny a subject. In the first summer of his presidency in 1809, Madison had been forced to rush back to Washington from a vacation at Montpelier, his Virginia estate, leaving Dolley behind. In a note he wrote to her after returning to the White House, he said he intended to bring her up to date on intelligence just received from France. And he sent her the morning newspaper, which had a story on the subject. In a letter two days later, he discussed a recent speech by the British prime minister; clearly, Dolley had become the president's political partner.

THE BRITISH HAD BEEN RELENTLESS in their determination to reduce Americans to obedient colonists once more. Checked by an American naval victory on Lake Erie on September 10, 1813, and the defeat of their Indian allies in the West, almost a month later, the British concentrated their assault on the coastline from Florida to Delaware Bay. Again and again their landing parties swarmed ashore to pillage homes, rape women, and burn public and private property. The commander of these operations was Sir George Cockburn, a strutting, red-faced rear admiral, widely considered to be as arrogant as he was ruthless.

Even as many Washington residents began packing up families and furniture, Dolley, in correspondence at the time, continued to insist that no British Army could get within 20 miles of the city. But the drumbeat of news about earlier landings—British troops had sacked Havre de Grace, Maryland, on May 4, 1813, and tried to take Craney Island, near Norfolk, Virginia, in June of that year—intensified criticism of the president. Some claimed that Dolley herself was planning to flee Washington; if Madison attempted to abandon the city as well, critics threatened, the president and the city would "fall" together. Dolley wrote in a letter to a friend: "I am not the least alarmed at these things but entirely disgusted & determined to stay with him."

On August 17, 1814, a large British fleet dropped anchor at the mouth of the Patuxent River, only 35 miles from the nation's capital. Aboard were 4,000 veteran troops under the command of a tough professional soldier, Maj. Gen. Robert Ross. They soon came ashore in Maryland without a shot being fired and began a slow, cautious advance on Washington. There was not a single trained American soldier in the vicinity to oppose them. All President Madison could do was call out thousands of militia. The commander of these jittery amateurs was Brig. Gen. William Winder, whom Madison had appointed largely because his uncle, the governor of Maryland, had already raised a sizable state militia.

Winder's incompetence became obvious, and more and more of Dolley's friends urged her to flee the city. By now thousands of Washingtonians were crowding the roads. But Dolley, whose determination to stay with her husband was unwavering, remained. She welcomed Madison's decision to station 100 militiamen under the command of a regular Army colonel on the White House lawn. Not only was it a gesture of protection on his part, it was also a declaration that he and Dolley intended to stand their ground. The president then decided to join the 6,000 militiamen who were marching to confront the British in Maryland. Dolley was sure his presence would stiffen their resolve.


into the hands of British soldiery, events
must determine.
Our kind friend Mr. Carroll has come
to hasten my departure and is in a most
kind humor with me because I insist
on waiting until the large picture of
Gen. Washington is secured, and it
49949
requires to be unscrewed from the wall.
This process was found too tedious for the

Madison (top left) valued his wife's political acumen (top right: Dolley in 1804). As the British advanced, the first lady perceived the portrait's symbolic importance to the nation: "I insist on waiting until the large picture of Gen. Washington is secured," she wrote in a letter to her sister (right).

After the president had ridden off, Dolley decided to show her own resolve by throwing a dinner party, on August 23. But after *The National Intelligencer* newspaper reported that the British had received 6,000 reinforcements, not a single invitee accepted her invitation. Dolley took to going up to the White House roof to scan the horizon with a spyglass, hoping to see evidence of an American victory. Meanwhile, Madison sent her two scribbled messages, written in quick succession on August 23. The first assured her that the British would easily be defeated; the second warned her to be ready to flee on a moment's notice.

Her husband had urged her, if the worst happened, to save the cabinet papers and every public document she could cram into her carriage. Late in the afternoon of August 23, Dolley began a letter to her sister Lucy, describing her situation. "My friends and acquaintances are all gone," she wrote. The army

BURSTEIN COLLECTION / CORBIS; THE WHITE HOUSE HISTORICAL ASSOCIATION (WHITE HOUSE COLLECTION); PICTURE HISTORY

colonel and his 100-man guard had also fled. But, she declared, "I am determined not to go myself until I see Mr. Madison safe." She wanted to be at his side "as I hear of much hostility toward him . . . disaffection stalks around us." She felt her presence might deter enemies ready to harm the president.

At dawn the next day, after a mostly sleepless night, Dolley was back on the White House roof with her spyglass. Resuming her letter to Lucy at midday, she wrote that she had spent the morning "turning my spy glass in every direction and watching with unwearied anxiety, hoping to discern the approach of my dear husband and his friends." Instead, all she saw was "groups of military wandering in all directions, as if there were a lack of arms, or of spirit to fight for their own firesides!" She was witnessing the disintegration of the army that was supposed to confront the British at nearby Bladensburg, Maryland.

While advancing toward the capital, Rear Adm. Sir George Cockburn (top: in an 1819 print) sent word to Mrs. Madison that he soon expected to "make his bow" in her drawing room—as the conqueror of a defeated Washington (below: the capture of the city on August 24, 1814). "Where I shall be tomorrow, I cannot tell," Dolley wrote before fleeing the White House.

PICTURE HISTORY; CORBIS

Although the boom of cannon was within earshot of the White House, the battle—five or so miles away at Bladensburg—remained beyond the range of Dolley's spyglass, sparing her the sight of American militiamen fleeing the charging British infantry. President Madison retreated toward Washington, along with General Winder. At the White House, Dolley had packed a wagon with the red silk velvet draperies of the Oval Room, the silver service and the blue and gold Lowestoft china she had purchased for the state dining room.

Resuming her letter to Lucy on that afternoon of the 24th, Dolley wrote: "Will you believe it, my sister? We have had a battle or skirmish . . . and I am still here within sound of the cannon!" Gamely, she ordered the table set for a dinner for the president and his staff, and insisted that the cook and his assistant begin preparing it. "Two messengers covered with dust" arrived from the battlefield, urging her to flee. Still she refused, determined to wait for her husband. She ordered the dinner to be served. She told the servants that if she were a man, she would post a cannon in every window of the White House and fight to the bitter end.

The arrival of Maj. Charles Carroll, a close friend, finally changed Dolley's mind. When he told her it was time to go, she glumly acquiesced. As they prepared to leave, according to John Pierre Sioussat, the Madison White House steward, Dolley noticed the Gilbert Stuart portrait of George Washington in the state dining room. She could not abandon it to the enemy, she told Carroll, to be mocked and desecrated. As he looked anxiously on, Dolley ordered servants to take down the painting, which was screwed to the wall. Informed they lacked the proper tools, Dolley told the servants to break the frame. (The president's enslaved White House footman, Paul Jennings, later produced a vivid account of these events; see sidebar, p. 55.) About this time, two more friends—Jacob Barker, a wealthy ship owner, and Robert G. L. De Peyster—arrived at the White House to offer whatever help might be needed. Dolley would entrust the painting to the two men, saying they must conceal it from the British at all costs; they would transport the portrait to safety in a wagon. Meanwhile, with remarkable self-possession, she completed her letter to Lucy: "And now, dear sister, I must leave this house . . . where I shall be tomorrow, I cannot tell!"

As Dolley headed for the door, according to an account she gave to her grandniece, Lucia B. Cutts, she spotted a copy of the Declaration of Independence in a display case; she put it into one of her suitcases. As Dolley and Carroll reached the front door, one of the president's servants, a free African-American named Jim Smith, arrived from the battlefield on a horse covered in sweat. "Clear out! Clear out," he shouted. The British were only a few miles away. Dolley and Carroll climbed into her carriage and were driven away to take refuge at his comfortable family mansion, Belle Vue, in nearby Georgetown.

The British arrived in the nation's capital a few hours later, as darkness fell. Admiral Cockburn and General Ross issued orders to burn the Capitol and the Library of Congress, then headed to the White House. According to Lt. James Scott, Cockburn's aide-de-camp, they found the dinner Dolley had ordered still on the table in the dining room. "Several kinds of wine in handsome cut glass decanters sat on the sideboard," Scott would later recall. The officers sampled some of the dishes and drank a toast to "Jemmy's health."

Soldiers roamed the house, grabbing souvenirs. According to historian Anthony Pitch, in *The Burning of Washington*, one man strutted around with one of President Madison's hats on his bayonet, boasting that he would parade it through the streets of London if they failed to capture "the little president."

Under Cockburn's direction, 150 men smashed windows and piled White House furniture in the center of the various

rooms. Outside, 50 of the marauders carrying poles with oil-soaked rags on the ends surrounded the house. At a signal from the admiral, men with torches ignited the rags, and the flaming poles were flung through the smashed windows like fiery spears. Within minutes, a huge conflagration soared into the night sky. Not far away, the Americans had set the Navy Yard on fire, destroying ships and warehouses full of ammunition and other materiel. For a time, it looked as if all Washington were ablaze.

The next day, the British continued their depredations, burning the Treasury, the State and War departments and other public buildings. An arsenal on Greenleaf's Point, about two miles south of the Capitol, exploded while the British were preparing to destroy it. Thirty men were killed and 45 were injured. Then a freak storm suddenly erupted, with high winds and violent thunder and lightning. The shaken British commanders soon retreated to their ships; the raid on the capital had ended.

Meanwhile, Dolley had received a note from Madison urging her to join him in Virginia. By the time they were finally reunited there on the night of August 25, the 63-year-old president had barely slept in several days. But he was determined to return to Washington as soon as possible. He insisted that Dolley remain in Virginia until the city was safe. By August 27, the president had reentered Washington. In a note written hastily the next day, he told his wife: "You cannot return too soon." The words seem to convey not only Madison's need for her companionship but also his recognition that she was a potent symbol of his presidency.

On August 28, Dolley joined her husband in Washington. They stayed at the home of her sister Anna Payne Cutts, who had taken over the same house on F Street that the Madisons had occupied before moving to the White House. The sight of the ruined Capitol—and the charred, blackened shell of the White House—must have been almost unbearable for Dolley. For several days, according to friends, she was morose and tearful. A friend who saw President Madison at this time described him as "miserably shattered and woebegone. In short, he looks heartbroken."

Although Dolley was unable to personally carry the Washington portrait (right) with her during her flight from the White House (below: the first lady, wearing bonnet, surrounded by fellow refugees), she delayed her departure until the last possible moment to arrange for its safekeeping. According to historian Beth Taylor, Dolley's primary concern was that "this iconic image not be defiled."

Madison also felt betrayed by General Winder—as well as by his Secretary of War, John Armstrong, who would resign within weeks—and by the ragtag army that had been routed. He blamed the retreat on low morale, the result of all the insults and denunciations of "Mr. Madison's War," as the citizens of New England, the center of opposition, labeled the conflict.

IN THE AFTERMATH OF THE BRITISH rampage through the nation's capital, many urged the president to move the government to a safer place. The Common Council of Philadelphia declared its readiness to provide housing and office space for both the president and Congress. Dolley fervently maintained that she and her husband—and Congress—should stay in Washington. The president agreed. He called for an emergency session of Congress to take place on September 19. Meanwhile, Dolley had persuaded the Federalist owner of a handsome brick dwelling on New York Avenue and 18th Street, known as the Octagon House, to let the Madisons use it as an official residence. She opened the social season there with a crowded reception on September 21.

DOLLEY SOON FOUND unexpected support elsewhere in the country. The White House had become a popular national symbol. People reacted with outrage when they heard that the British had burned the mansion. Next came a groundswell of

THE WHITE HOUSE HISTORICAL ASSOCIATION (WHITE HOUSE COLLECTION); BETTMANN / CORBIS

WITNESS TO HISTORY

THE FIRST MEMOIR BY A WHITE HOUSE SLAVE RECREATES THE EVENTS OF AUGUST 23, 1814

THE TALE OF DOLLEY MADISON'S rescue of the Gilbert Stuart portrait of George Washington is known mainly through Dolley's own letters and diary. But another firsthand account, by Paul Jennings, a slave who served as President Madison's footman, is getting new attention. Beth Taylor, a historian at Montpelier, Madison's Virginia estate, arranged for nearly two dozen descendants of Jennings to view the painting at the White House this past August.

Jennings believed misperceptions had arisen over time. "It has often been stated in print," he recalled years after the fact, "that when Mrs. Madison escaped from the White House, she cut out from the frame the large portrait of Washington . . . and carried it off. This is totally false." Jennings continued: "She had no time for doing it. It would have required a ladder to get it down. All she carried off was the silver in her reticule, as the British were . . . expected every moment."

Above left: Jennings' account amplifies the rescue of Washington's portrait; Jennings' descendants (right) gathered to see the portrait at the White House this past August.

Jennings said White House staffers John Sioussat, a steward, and Thomas McGraw, a gardener, removed the canvas "and sent it off on a wagon, with some large silver urns and such other valuables as could be hastily got hold of."

Jennings had come to the White House in 1809, at about age 10, from Montpelier. Dolley kept Jennings until 1846, when, by then an impoverished widow, she sold him to Pollard Webb, an insurance agent, for $200. Six months later, Massachusetts Senator Daniel Webster purchased Jennings' freedom for $120, an amount Jennings agreed to work off as Webster's servant. In 1851, Webster recommended Jennings for a job at the Pension Office. In 1865, his recollections were published in *A Colored Man's Reminiscences of James Madison*—believed to be the first published account by a White House slave as well as the first White House staff memoir. But it attracted little notice.

Taylor has unearthed the only known photograph of Jennings (who died in 1874) and discovered details of his marriage to Fanny Gordon, a slave on the plantation next to Montpelier. "It was the [Jennings] memoir that inspired me," Taylor says. She plans to complete a book about him this year.

admiration as newspapers reported Dolley's refusal to retreat and her rescue of George Washington's portrait and perhaps also a copy of the Declaration of Independence.

On September 1, President Madison issued a proclamation "exhorting all the good people" of the United States "to unite in their hearts and hands" in order "to chastise and expel the invader." Madison's former opponent for the presidency, DeWitt Clinton, said there was only one issue worth discussing now: Would the Americans fight back? On September 10, 1814, the *Niles' Weekly Register*, a Baltimore paper with a national circulation, spoke for many. "The spirit of the nation is roused," it editorialized.

THE BRITISH FLEET SAILED INTO THE PORT of Baltimore three days later, on September 13, determined to batter Fort McHenry into submission—which would allow the British to seize harbor ships and to loot waterfront warehouses—and force the city to pay a ransom. Francis Scott Key, an American lawyer who had gone aboard a British flagship at the request of President Madison to negotiate the release of a doctor seized by a British landing party, was all but certain that the fort would surrender to a nightlong bombardment by the British. When Key saw the American flag still flying at sunrise, he scribbled a poem that began, "Oh say can you see by the dawn's early light?" Within a few days, the words, set to the music of a popular song, were being sung all over Baltimore.

Good news from more distant fronts also soon reached Washington. An American fleet on Lake Champlain won a surprise victory over a British armada on September 11, 1814. The discouraged British had fought a halfhearted battle there and retreated to Canada. In Florida, after a British fleet arrived in Pensacola Bay, an American Army commanded by Gen. Andrew Jackson seized Pensacola (under Spanish control since the late 1700s) in November 1814. Thus, the British were deprived of a place to disembark. President Madison cited these victories in a message to Congress.

SYLVIA JENNINGS ALEXANDER / THE MONTPELIER FOUNDATION; JONATHAN ERNST

But the House of Representatives remained unmoved; it voted 79-37 to consider abandoning Washington. Still, Madison resisted. Dolley summoned all her social resources to persuade the congressmen to change their minds. At Octagon House, she presided over several scaled-down versions of her White House galas. For the next four months, Dolley and her allies lobbied the legislators as they continued to debate the proposal. Finally, both houses of Congress voted not only to stay in Washington but also to rebuild the Capitol and White House.

THE MADISONS' WORRIES were by no means over. After the Massachusetts legislature called for a conference of the five New England states to meet in Hartford, Connecticut, in December 1814, rumors swept the nation that the Yankees were going to secede or, at the very least, demand a semi-independence that could spell the end of the Union. A delegate leaked a "scoop" to the press: President Madison would resign.

Meanwhile, 8,000 British forces had landed in New Orleans and clashed with General Jackson's troops. If they captured the city, they would control the Mississippi River Valley. In Hartford, the disunion convention dispatched delegates to Washington to confront the president. On the other side of the Atlantic, the British were making outrageous demands of American envoys, headed by Treasury Secretary Albert Gallatin, aimed at reducing the United States to subservience. "The prospect of peace appears to get darker and darker," Dolley wrote to Gallatin's wife, Hannah, on December 26.

On January 14, 1815, a profoundly worried Dolley wrote again to Hannah: "The fate of N Orleans will be known today—on which so much depends." She was wrong. The rest of January trickled away with no news from New Orleans. Meanwhile, the delegates from the Hartford Convention reached Washington. They were no longer proposing secession, but they wanted amendments to the Constitution restricting the president's power, and they vowed to call another convention in June if the war continued. There was little doubt that this second session would recommend secession.

Federalists and others predicted New Orleans would be lost; there were calls for Madison's impeachment. On Saturday, February 4, a messenger reached Washington with a letter from General Jackson reporting that he and his men had routed the British veterans, killing and wounding about 2,100 of them with a loss of only 7. New Orleans—and the Mississippi River—would remain in American hands! As night fell and the news swept through the nation's capital, thousands of cheering celebrants marched along the streets carrying candles and torches. Dolley placed candles in every window of Octagon House. In the tumult, the Hartford Convention delegates stole out of town, never to be heard from again.

Ten days later, on February 14, came even more astonishing news: Henry Carroll, secretary to the American peace delegation, had returned from Ghent, Belgium. A buoyant Dolley urged her friends to attend a reception that evening. When they arrived, they were told that Carroll had brought a draft of a peace treaty; the president was upstairs in his study, discussing it with his cabinet.

Dolley (below: age 80 in 1848) was revered for saving the fledgling republic's treasures. Of her hurried departure from the White House, she would later recall: "I lived a lifetime in those last moments."

The house was jammed with representatives and senators from both parties. A reporter from *The National Intelligencer* marveled at the way these political adversaries were congratulating each other, thanks to the warmth of Dolley's smile and rising hopes that the war was over. "No one . . . who beheld the radiance of joy which lighted up her countenance," the reporter wrote, could doubt "that all uncertainty was at an end." This was a good deal less than true. In fact, the president had been less than thrilled by Carroll's document, which offered little more than an end to the fighting and dying. But he decided that accepting it on the heels of the news from New Orleans would make Americans feel they had won a second war of independence.

Dolley had shrewdly stationed her cousin, Sally Coles, outside the room where the president was making up his mind. When the door opened and Sally saw smiles on every face, she rushed to the head of the stairs and cried: "Peace, Peace." Octagon House exploded with joy. People rushed to embrace and congratulate Dolley. The butler began filling every wineglass in sight. Even the servants were invited to drink, and according to one account, would take two days to recover from the celebration.

Overnight, James Madison had gone from being a potentially impeachable president to a national hero, thanks to Gen. Andrew Jackson's—and Dolley Madison's—resolve. Demobilized soldiers were soon marching past Octagon House. Dolley stood on the steps beside her husband, accepting their salutes.

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WELCOME TO BARROW, ALASKA

NO ROADS LEAD TO BARROW, ALASKA. To reach America's northernmost city (pop. 4,500), you must fly or, sea ice permitting, take a ship. Barrow's residents use cars or four-wheel-drive ATVs in town and have been known to hunt caribou on snowmobiles, even in summer. The treads leave dark trails in the tundra, the blanket of spongy brown and green vegetation that stretches south for hundreds of miles. I was coming in on a U.S. Coast Guard C-130 transport plane. Looking down through a small window I saw a triangular-shaped town hugging the edge of the continent at the junction of the Chukchi and Beaufort seas. It was August, and the ocean looked as black as anthracite.

The city's small wooden homes were built on pilings to keep them from melting the permafrost, which would cause them to sink. I saw jumbles of vehicles, fish-drying racks and small boats in front yards. The roads looked muddy. I saw a large supermarket and a new hospital going up near some office buildings. To the north, along a coast road, I spotted Quonset huts marking my destination—a repurposed World War II-era U.S. Navy base. Concerns about climate change have turned a drizzle of visiting scientists into a flood; I've visited Barrow when scientists filled every bed on the former base, bunked ten to a room in a dilapidated house in town and slept in cots laid out in rows in the community center.

I had come to Barrow to learn about ice and climate change from Eskimo elders and hunters and from scientists. For two weeks I'd been visiting northern Alaska coastal villages as a guest of the Coast Guard, and what I'd heard was disturbing. Each year the sea ice was getting thinner and arriving later. Coastal storms have become so dangerous that some villages—lacking the shore ice that used to protect them—will have to be moved miles inland. In one village I watched the Army Corps of Engineers build rock walls to shield against fierce waves. Fish species from warmer waters were showing up in fishing nets. Insects that no one recalled seeing before—such as spruce bark beetles, which kill trees—were falling from the sky. There was a proliferation of flies that make caribou sick.

Inland, elders told me, tundra lakes were disappearing, and with them drinking water and nesting grounds for millions of migrating birds. River banks—without enough ice to shore them up—were eroding, filling the waterways with silt. When hunters went out after moose, their boats increasingly ran aground in flats.

"It's harder to find food," I heard again and again.

AFTER THE C-130 LANDED, Donald "Nok" Acker of the Barrow Arctic Science Consortium (BASC), a nonprofit research support organization founded by Inupiat Eskimos, picked me up in his mud-spattered Ford truck. I stowed my gear in a dormitory for scientists, and Acker drove me to see Edward Itta, the mayor of North Slope Borough, the largest county (the size of Wyoming) in the United States. Itta is an Inupiat whaling captain as well as a politician who deals with members of Congress, White House officials and military authorities who travel to Barrow for much the same reason I did. His office is in a modern, airy two-story building with new computers and a natural gas heating system, paid for, he told me, by tax revenues from oil fields at Prudhoe Bay. Oil companies there contribute some $250 million a year to the North Slope Borough.

"Barrow is ground zero for climate-change science," Itta said. "We worry that climate change is shrinking the sea ice

LAURA RAUCH / AP IMAGES; P. 59 ALASKA STOCK

GROUND ZERO FOR CLIMATE CHANGE

Scientists converge on the northernmost city in the United States to study global warming's dramatic consequences

BY BOB REISS

In Barrow, winter temperatures have been several degrees warmer on average than they were just a few decades ago. Scientists have been descending on the Alaska city (opposite: a monument made of whale bones) since 1973.

and we don't know how that will affect the animals that depend on it. At this time there is no effective plan if a catastrophe such as a ship collision or oil spill occurs. The Coast Guard hasn't decided what its presence will be in the Arctic. Someone needs to monitor new traffic as the ice recedes and when tourist ships come through the Northwest Passage, which is already happening."

THE ARCTIC IS WARMING TWICE AS FAST as the rest of the planet, according to a 2004 Arctic Climate Impact Assessment report, the most recent available. Summer sea ice in the region shrank by nearly 40 percent between 1978 and 2007. Winter temperatures have been several degrees Fahrenheit warmer than they were a few decades ago. Trees have spread into the tundra. In 2008, a wildfire broke out in an area north of the Brooks Range, where the local dialect had no word for forest fire.

Even officials who question the source of the warming are concerned. "I'm agnostic as to the causes," Coast Guard Commandant Thad Allen told me. "All I know is there is water where there was once ice." And where there is water, "we are responsible for it."

One major consequence is that a new Arctic shipping route around the top of Alaska is expected to open in the next few years, or decades, cutting thousands of miles off trips between Asia and Europe and Asia and the Eastern United States. The fabled Northwest Passage, from Baffin Bay in Eastern Canada to the Pacific Ocean, was frozen for centuries, and attempts to navigate it cost hundreds of European explorers their lives.

But in the past few summers, so much ice has melted that the Northwest Passage actually became navigable. "We've never seen ice melt like this in history," ice forecaster Luc Desjardins of the Canadian Ice Service said in 2008. That summer, two German tourist ships made it through; travel agents are now booking reservations for trips through the passage.

Commercial shipping operations—which abide by different regulations, require more long-term planning and cannot risk having to retreat to the longer route through the Panama Canal—are likely to follow the tourist ships once the passage is more dependably navigable. A single container ship using the route to reach New York City from China could save up to $2 million on fuel and Panama Canal tolls. The passage is expected to open to regular commercial shipping, in summers, sometime between 2013 and 2050. (Icebreakers have enabled the Soviet Union and Russia to use the Northeast Passage, also known as the Northern Sea Route, since the 1930s. When two German commercial cargo vessels made it through last summer, the first non-

"Looking down through a small window, I saw a triangular-shaped town hugging the edge of the continent at the junction of the Chukchi and Beaufort seas," the author writes of his view of Barrow.

PAUL ANDREW LAWRENCE

Russian ships to do so, they made headlines around the world.)

"The [entire North] Alaskan Coast may come to look like the coast of Louisiana today, filled with the lights of ships and oil rigs," says Scott Borgerson, a visiting fellow for ocean governance at the Council on Foreign Relations.

But the opening of North Alaskan waters to ship traffic poses a host of new challenges for the Coast Guard, which is responsible for security and safety from the Bering Strait to Canada, some 1,000 miles. Security threats along Alaska's long, unguarded coastline are likely to increase. There may be shipwrecks and fuel spills. "The Bering Strait will be the new choke point for world shipping," Coast Guard Adm. Gene Brooks told me. "We're going to have problems." In recent summers, the Coast Guard has racheted up its visits to Arctic-area villages to learn about the people and operating conditions in the north. It has helicoptered in teams of doctors and veterinarians and held small-boat and helicopter exercises to practice rescue missions. But, Brooks added, "We don't have the infrastructure: radio towers, communication, all the things that states in the lower 48 have."

FOR THEIR PART, ALASKAN ESKIMOS worry that the problems associated with increased traffic will affect their food supply. Much of their diet comes from seals, walrus and whales, which may be killed or displaced by human activity. (Packaged food is available but costly. In one town I saw a 16-ounce jar of mayonnaise for $7. A gallon of milk cost $11.) "It is alarming to contemplate the explosion of ship traffic on subsistence hunting and animal migration," said Vera Metcalf, director of the Eskimo Walrus Commission.

But less ice also spells opportunity. Under a 1982 international treaty called the Convention on the Law of the Sea, Arctic nations can claim sea floor as national territory if they can prove, by mapping the ocean floor, that the areas are extensions of their continental shelves. The implications are staggering because an estimated 22 percent of the world's undiscovered oil and gas reserves lies beneath Arctic seas, according to the U.S. Geological Survey. Energy and ocean policy consultant Paul Kelly calls the potential expansion "the greatest division of lands on earth possibly ever to occur, if you add up claims around the world."

The United States, which stands to gain territory the size of California, is woefully behind in the race to develop its territorial claims, critics say. Russia and Norway have already submitted claim applications to a United Nations-based commission that will help determine ownership. Russia and Canada have beefed up their Arctic military forces, and Canada has installed sensors on Devon Island in the high arctic to detect rogue ships.

In 2007, Russia dropped a titanium flag on the ocean floor

Hundreds of European explorers died in search of a Northwest Passage (right: blue line on map). In the past few years, so much sea ice has melted in the summer that several cruise ships have navigated through the passage. "Someone needs to monitor new ship traffic," says Mayor Edward Itta (above: in his Barrow office). Warmer weather is also melting ice that normally protects the shore, increasing the risk of flooding. (Above right: sand bags protect Barrow's shoreline.)

BOB REISS; LUCIAN READ; MAP: GUILBERT GATES

Nations that border the Arctic—including the United States, Russia, Canada and Norway—are racing to lay claim to territory beneath the Arctic Ocean (above left: a Russian sub plants a flag on the North Pole seafloor). Studies of the geology of the Arctic (above: facilities in Barrow; left: the U.S. Coast Guard cutter *Healy*) will guide these territorial claims.

at the North Pole—an act that some have likened in its wake-up effect to the 1957 launch of *Sputnik*. Artur Chilingarov, the Russian legislator and explorer who dropped the flag, boasted that "the Arctic is ours." Russia has 18 icebreakers and plans to build floating nuclear power plants for use in the Arctic. In contrast, the United States has two polar-class icebreakers.

In fact, the United States will have little say in the decision to award land claims because some members of the U.S. Senate, citing national security, have blocked ratification of the 1982 treaty for more than two decades. "If this was a baseball game," Admiral Brooks has said, "the United States wouldn't be on the field, the stands, even the parking lot."

"Until now the Arctic was in a frozen state, both literally and figuratively," Borgerson said. "As it thaws, these new issues emerge."

"HOLD THE SHOTGUN and watch out for polar bears."

John Lenters pushed a metal boat into a freshwater lake three miles south of Barrow and motioned for me to climb aboard. The wind was stiff, the sun bright, the vista dotted with Arctic flowers—marsh marigold and Arctic cotton. Lenters, a hydroclimatologist at the University of Nebraska, studies how tundra lakes are responding to climate change. Now he was steering toward a yellow speck in the middle of the lake, a climate-monitoring buoy due for scheduled maintenance.

The tundra is a vast watery wilderness filled with snaking rivers and tens of thousands of elliptically shaped lakes supporting moose, caribou and polar bears. From the air, with its clouds and mist, it looked, oddly enough, more like the Amazon basin than the desert that one of Lenters' colleagues called it and by some definitions it is. (Lenters himself says only that "precipitation is slight.") But what precipitation there is, Lenters explained, is prevented from seeping into the soil by permafrost, the layer of frozen earth that begins about two feet beneath the surface and goes down, in North Alaska, some 2,000 feet. Globally, permafrost holds an estimated 400 gigatons of methane, one of the greenhouse gases that is hastening the earth's warming. As the permafrost thaws—which it has begun to do—lakes can drain away and the thawed soil can release billions of tons of methane into the atmosphere.

Lenters pulled up to the buoy and, balanced on the prow of the boat, began wrapping duct tape around some of the buoy's wires to protect them. "This is the grunt work of science," he said. A swiveling arm on the buoy measured wind speed. Solar panels on its three sides provided power. A glass-domed instrument on top registered incoming infrared radiation to monitor the greenhouse effect—the rise in temperature that results from the trapping of heat by certain gases, such as carbon dioxide, in the atmosphere.

Lenters said that he and other researchers—aided by

BOB REISS *is a New York City writer. His book* The Coming Storm *chronicles events related to global warming.*

RTR RUSSIAN CHANNEL / AP IMAGES; BOB REISS; U.S. COAST GUARD / AP IMAGES

Field work in the Arctic tends to be cold, uncomfortable and a little tedious. (John Lenters and Sandra Jones deploy a climate-monitoring buoy.)

BOB REISS

decades-old satellite images as well as consultations with Inupiat—are visiting tundra lakes all over the area, walking their perimeters and measuring their size, water depth and temperature. "Everything up here is related to climate change," Lenters said, "but to understand it you must learn the underlying dynamics."

In his camouflage clothes and waders, Lenters looked like a deer hunter as he jury-rigged repairs and took measures to protect the buoy from various assaults over the next ten months. Windblown chunks of ice might partially submerge it, and once the lake freezes over, a curious Arctic fox might nibble on its wires. While tending the buoy last year, Lenters spotted two polar bears a quarter-mile away swimming toward him. Bears are an ever-present concern. Guards with shotguns sometimes stand watch at high- school football games. (While I was in Barrow, a bear wandered past BASC headquarters. Another took pieces out of a scientist's boat; no one was inside.) While Lenters worked, I scanned the horizon.

Lenters said that while he'd collected only about a year's worth of data, he'd already been surprised by it. Typically, he said, lake beds release as much heat into the water in the winter and spring as they absorb in the summer and fall. This balance keeps the annual sediment temperatures fairly stable. "But what we found was that heat was going into the lake sediment almost all year long." It's too soon to draw any firm conclusions, he added, "but the water temperatures are out of equilibrium with the lake sediment, causing a nearly continuous thawing of the underlying permafrost. The lake is out of whack." Then he turned the boat around and we headed back to town for some hot soup.

BOWHEAD WHALES ARE NAMED for the massive bony skulls that enable them to break through ice to breathe. They can live up to 200 years; adults weigh up to 100 tons. Their biannual migrations between the Bering Sea and the Eastern Beaufort Sea carry them past Barrow each fall and spring. "The whale is central to our culture," Mayor Itta had told me. "The warmer ocean and currents will markedly shorten our spring whaling season." He was concerned about possible changes in whale migration patterns and sea ice conditions; hunters must travel over ice to reach whales. "The impacts are around us already. We need more baseline science so we can measure these impacts over time."

Which was one reason that—about 20 miles out to sea—Eskimo whalers and researchers aboard three small boats rode the chop, looking to tag bowheads with radio devices. Mark Baumgartner, a biologist from the Woods Hole Oceanographic Institution in Massachusetts, was looking for answers to the same questions as the whalers with him. "We think the environment is going to change," he said. "We don't exactly know how. This is part of a study to learn how the animals forage and how food is organized." If warming seas cause the whales' preferred foods to move, the whales could follow—with disastrous consequences for Eskimos.

Carin Ashjian, another Woods Hole biologist, was on a sister ship, the 43-foot-long *Annika Marie*, studying krill, a shrimplike animal that bowheads eat. Massive amounts of krill pile up on the continental shelf off Barrow each year in the fall. The krill are pushed by sea currents and wind, both of which can be affected by weather patterns. "We want to know whether there will be more or less krill with climate warming," Ashjian explained. She said her five-year-old study was still too new to yield any firm conclusions: "The Arctic is changing so fast that when it comes to learning basics, we may have started too late."

In a third study relating to bowheads, Kate Stafford, an oceanographer at the University of Washington, had come to Barrow to service the hydrophones, or undersea microphones, she'd put in the water a year before. She was monitoring sounds—from waves, marine mammals, the breaking of ice and the passing of ships.

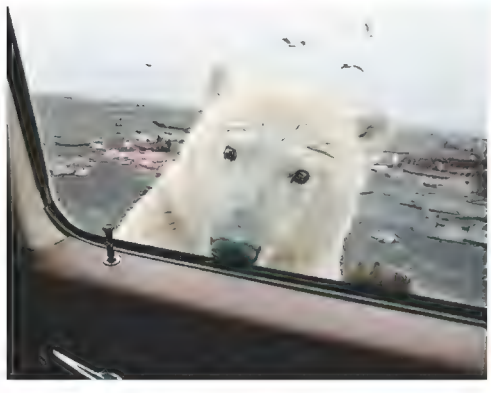
"Marine mammals use sound to communicate and navigate," she said. "When the water is covered with ice it's pretty quiet down there. During spring breakup it gets noisy. If the ice becomes thinner in winters or goes away, it may become more difficult for animals to communicate."

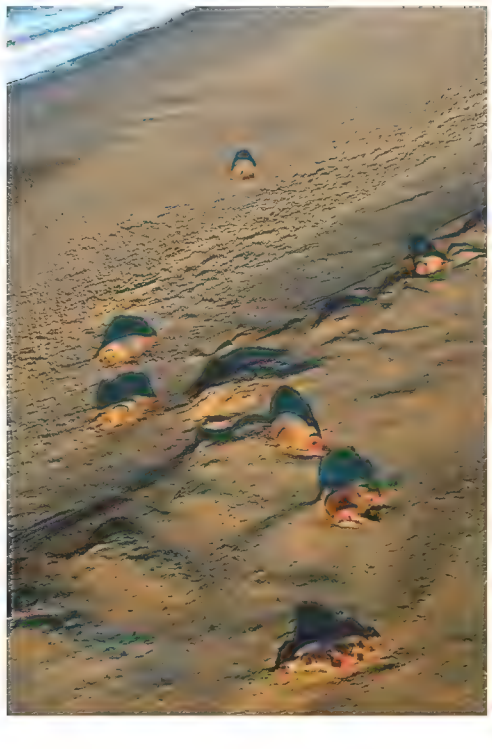
Shell Oil representatives, in town for hearings on proposed exploratory drilling in the Chukchi Sea, are also interested in bowheads. Shell's attempts to drill in the Beaufort Sea were blocked by a court injunction in 2007, when a coalition of environmentalists, native groups and the North Slope Borough filed suit. The coalition cited the effects on marine mammals, particularly bowhead whales, from the drilling. (The company has approval from the Interior Department to drill this coming summer, but environmental and native groups are challenging the plan.)

Concerns about whales go to the heart of the relationship between scientists and Barrow residents. In 1977, the International Whaling Commission, citing studies showing that bowheads were an endangered species, banned Eskimo whaling on the North Slope. But Barrow residents said they had seen plenty of bowheads, and their protests led to new research on whales' population. The ban was replaced by a quota after six months.

Richard Glenn is a whaler and businessman, and vice president of the Arctic Slope Regional Corporation (ASRC), a for-profit organization owned by Inupiat shareholders. Along with other community leaders, Glenn helped found BASC, which offers scientists laboratory space, cellphones, a support staff and an environment where researchers often end up collaborating on studies. "This is a town of ice experts," Glenn told me. "Our job is to have a running inventory of conditions. Put that together with science and the cultural differences disappear. It becomes like two good mechanics talking about a car."

Back in 1973 the National Oceanic and Atmospheric Administration (NOAA), the federal agency responsible for predicting changes in the earth's environment, selected Barrow as one of five key spots on the globe to make atmospheric baseline studies. "We wanted places that were far removed





Polar bears are a danger in Barrow and other coastal Alaskan villages (above left: a cub in Kaktovik). But as warmer weather melts the sea ice, polar bears and other species that hunt from the ice have a more difficult task reaching their prey (left: dead walruses on the Chukchi Sea). Bowhead whales (above) are a major source of food for Native Alaskans. Scientists in Barrow are studying the whales' migration patterns as well as the abundance of the krill that feeds bowheads off Barrow each year.

KAT WADE / SAN FRANCISCO CHRONICLE / CORBIS; DENIS SCOTT / CORBIS; TONY FISCHBACH / U.S. GEOLOGICAL SURVEY / AP IMAGES

from large industrial sources of gases yet not so remote that they're impossible to get to," said Dan Endres, who ran the agency's Barrow facility for 25 years until 2009.

Today, sensors in NOAA's Barrow observatory—basically a set of trailer-like buildings filled with scientific equipment, perched on pilings over tundra—sniff the air for ozone, carbon dioxide, other gases and pollution, some of which comes from Chinese factories thousands of miles away. In summer, carbon dioxide is absorbed by boreal forests in Russia and Canada. In autumn, the vegetation dies and the carbon dioxide is released back into the air. This oscillation is the largest fluctuation on earth and has been likened to the planet breathing.

Inside one trailer, John Dacey, a Woods Hole biologist, was installing equipment to measure dimethyl sulfide, a gas scientists use to track the formation of particles called aerosols in the atmosphere. "Much like ice or snow, aerosols can reflect the sun's heat back to space," said NOAA research scientist Anne Jefferson. In other cases, "like a dark ocean surface, they can absorb the sun's heat." Jefferson was calibrating instruments for monitoring clouds and aerosols, part of a study of the role these factors play in warming and cooling.

Based on research undertaken at Barrow, we now know that the yearly average of carbon dioxide in the atmosphere increased in the Arctic by 16 percent between 1974 and 2008 and that methane increased an average of 5 percent between 1987 and 2008, according to Russ Schnell, deputy director of NOAA's global monitoring division. The snow melts about nine days earlier in the year than it did in the 1970s.

Snow and ice help explain why "a small change in the temperature in the Arctic can produce greater changes than in lower latitudes," said Endres. Snow reflects sunlight; once it melts, more energy is absorbed by the earth, melting even more snow. "Whatever is going to happen in the rest of the world happens first and to the greatest extent in the Arctic," said Endres. "The Arctic is the mirror of the world."

CHESTER NOONGWOOK, the last dog-sled mail carrier in the United States, is 76 years old and retired. He recently survived a brain aneurysm, but he looked strong and alert when I met him in Savoonga, a village of about 700 people on St. Lawrence Island, a 90-mile-long collection of mountains and tundra in the Bering Sea. Noongwook, who still hunts whales, showed me a book he co-authored, *Watching Ice and Weather Our Way,* which records Eskimo observations of the natural world. Then he gave me a lesson in the language of ice.

Maklukestaq, he said, is a Yupik Eskimo word for solid, slightly bumpy ice, capable of having a boat pulled across it. There is less maklukestaq of late. *Ilulighaq* refers to small- or medium-sized cakes of ice, big enough to support a walrus. *Nutemtaq*—old, thick ice floes—are safe for a seal or whale hunter. *Tepaan* is broken ice blown by wind against solid ice, dangerous to walk on.

In all, the Yupik language has almost 100 words for ice. Their subtle variations, passed down verbally over thousands of years—no written Eskimo language existed until

Chester Noongwook (left) wrote a book detailing the Eskimos' reflections on the weather. "The world is spinning faster now," he says. As the climate warms, old ways are also changing. (Right: a villager dries polar bear skins; above: Chester's son Milton worries about frozen food stored in melting permafrost.)

BOB REISS; ALASKA STOCK; BOB REISS

"Whatever is going to happen to the rest of the world," says Dan Endres of NOAA, "happens first and to the greatest extent in the Arctic."

about 100 years ago—can mean life or death for those who venture over frozen ocean, tundra lake or river. Elders are repositories of knowledge. Their photographs hang in schools, like those of presidents in the lower 48. But in some places, I was told, conditions have changed so much that elders have begun to doubt their ice knowledge.

"The world is spinning faster now," Noongwook said, by which I took him to mean that the weather, and the ice, have become less predictable.

Chester's son Milton Noongwook, 49, is the former secretary of the local tribal council. Showing me around Savoonga in an ATV, at one point he pulled out a Sibley Field Guide to the birds of North America. He said so many new kinds of birds are showing up, villagers need a guidebook to identify them.

As we drove up to the shore, Milton pointed to a series of large wooden boxes set deep into permafrost to store frozen walrus meat—winter food. He pulled aside a door and in the dark below I saw hunks of meat amid a sheen of frost. But it was also wet down there.

"It's melting," Milton said. "It never used to do that. If it gets too warm, the food will spoil."

BACK IN BARROW, I got a ride with a taxi driver from Thailand. "I'm here because I love snow," he told me. I ate dinner at Pepe's North of the Border Mexican restaurant. At midnight I found myself at a roller rink where a rock band, the Barrowtones, performed for people who might have been tagging bowheads earlier in the day.

On my last day, Richard Glenn took me in a small boat to the junction of the Chukchi and Beaufort seas. Seals popped up in the water. Glenn watched the sky, ready to turn back if the weather grew rough. We chugged through three-foot swells to Point Barrow, the northernmost tip of the North American continent. On the beach, orange ribbons marked an ancient burial ground. After a skeleton was found in 1997, community elders gave permission for Anne Jensen, an anthropologist with the Ukpeagvik Inupiat Corporation, which handles village land titles, to dig up the remains of the other 73 burials and, with help from Barrow high-school students, move them to Barrow's cemetery.

Glenn said that although there was no ice visible at the moment, it would soon begin to form. He spoke of it with love, the way a Vermont hiker might discuss leaf color in October or an Iowa farmer goes on about corn. Glenn said that one day, a few years back, he'd watched the sea go from liquid to ice in the course of a 12-mile hike.

Some time around October, he said, the waves now lapping against the shore would turn to slush, like "an unflavored Slurpee." Then, as temperatures dropped, the slush would congeal and become rigid. Colder still and the ocean would break against itself and form mountain ranges of ice "like plate tectonics on a smaller scale." Snow would cover it, and in spring the ice would weaken. "You can notice it and smell it. The animals know it." Finally, the whales, seals and ducks would start to come back to Barrow.

That's the way it always happened. That's the way it was supposed to happen. As the worsening weather closed in, Glenn turned the boat back to shore. He wasn't worried, he said. He would cope with climate change just as he'd coped with other changes he'd seen. "We may have to learn some new weather patterns," he said. "But we always have."

BETH IPSEN / ARCTIC SOUNDER / AP IMAGES

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The Mustang Mystique

Descended from animals that escaped the Spanish conquistadors almost 500 years ago, wild horses roam the West. But are they running out of room?

BY ABIGAIL TUCKER PHOTOGRAPHS BY MELISSA FARLOW

To create her haunting, intimate photographs of wild mustangs, Melissa Farlow staked out water holes across the West. In Nevada's Jackson Mountains, she slathered on sunscreen; in Oregon's Ochoco National Forest, she wore snowshoes. Visiting a South Dakota mustang preserve on a Sioux Indian reservation, she was lost in fog for what seemed like hours; at last she heard a soft nicker from a horse just 20 feet away, hidden in the mist.

When Farlow was photographing a herd in Oregon's remote Steens Mountain area, a pinto stallion charged out of the sagebrush at her, hooves churning. "All of a sudden I just sat down," Farlow said.

It worked. Seemingly assured of his own supremacy, the stallion quit snorting and stomping, and before long the photographer found herself being sniffed by mares and foals.

Farlow spent part of her childhood astride a one-eyed cow pony in southern Indiana and has photographed the lustrous Thoroughbreds of Kentucky's Bluegrass Country. But mustangs, she realized from spending months among them, are not ordinary horses. They are living emblems of the Old West, fleet exiles from a fenced world.

Mustangs are the feral descendants of 16th-century steeds the conquistadors brought to North America. The name comes from the Spanish *mestengo*, meaning stray. By the mid-1600s, Plains Indians were capturing and taming horses—which the Lakota called *sunka wakan*, or sacred dog—and the animals revolutionized their cultures. The Crow and the Sioux tribes mounted spectacular war parties

Horses brought by Spanish explorers in the 16th century bore a dark stripe along the spine, a feature that marks some mustangs today (in a South Dakota preserve).

"I was able to approach them, even walk with them eventually," says Melissa Farlow, who photographed wild mustangs for several years on federal and state as well as private lands in Oregon, Nevada, California (above), South Dakota (far right: a 2-week-old foal) and other states. "You learn to see which horses are fighting and who is stealing mares." Working around skittish horses, Farlow sometimes took a direct approach. "I'd come out in the open and I'd wave my arms real big and say, 'Hello, I'm coming to photograph you again!'" The horses make a "huh-huh-huh-huh" courting sound, she says, "like a deep-throated laugh." Some wild palomino pintos (right: a herd in South Dakota) are believed to be descended from escaped cavalry horses.

and hunted on horseback. White settlers also pressed mustangs into service, as did U.S. troops—including George Armstrong Custer's Seventh Cavalry—that battled the Great Plains peoples.

A ranger in Texas' Wild Horse Desert in the mid-1800s described a herd that took an hour to pass: "as far as the eye could extend on a dead level prairie, nothing was visible except a dense mass of horses." Escaped cavalry chargers and other runaways mixed with the original Spanish herds. Perhaps as many as two million mustangs were rambling around the western half of the country by the end of the 19th century, according to Deanne Stillman, who consulted roundup, slaughterhouse and other records for her book *Mustang: The Saga of the Wild Horse in the American West*.

By the early 20th century, mustangs were being sold in Europe as horse meat, turned into glue, pet food and pony fur coats in the United States, herded and harassed by airplanes and shot for sport. In 1950, Velma Johnston, a bank secretary on her way to work in Reno, Nevada, followed a livestock truck leaking blood, then watched in horror as wounded mustangs were unloaded at a slaughterhouse. Johnston, later called Wild Horse Annie, spent the rest of her life fighting for laws that culminated in the federal Wild Free-Roaming Horses and Burros Act of 1971, which protected mustangs on public lands. There were then about 17,000 wild mustangs left.

Today, some 37,000 of them roam more than 30 million acres of public land in the West, with large populations in Nevada, California, Utah, Wyoming and Oregon. In places where the animals are most concentrated—half of the horses live in Nevada—new problems are surfacing. Their overgrazing can lead to erosion and water pollution and make way for pesky invasive species like cheatgrass. Such ecological damage causes food shortages for the horses as well as the sage grouse, bighorn sheep, elk and domestic cattle that share their pastures.

The Bureau of Land Management (BLM), which is responsible for most of the wild mustangs, has plans to reduce the number under its jurisdiction by roughly 12,000

A herd can double every four years, and many live in territories with limited forage or water. “We don’t want to let the population explode to the point where they’re starving,” says Bureau of Land Management spokesman Tom Gorey. The agency regularly rounds up wild horses and moves them to corrals (above: near Eureka, Nevada). Farlow, who observed several “gathers,” says in many cases herding with helicopters “is not as menacing as it sounds.” The aircraft are “not bearing down, scaring the bejesus out of the horses. They’re more like annoying mosquitoes.” A symbol of the wide-open West, mustangs (far right: a mare and foal in South Dakota) face harsh conditions (right: in Oregon). “You wonder,” Farlow says: “How do they survive?”

See more of the wild horses at Smithsonian.com/mustangs

in 2010. This winter, the agency led a two-month-long helicopter "gather" in northwestern Nevada's Calico Mountains to relocate 2,500 horses, one of the largest roundups in recent years.

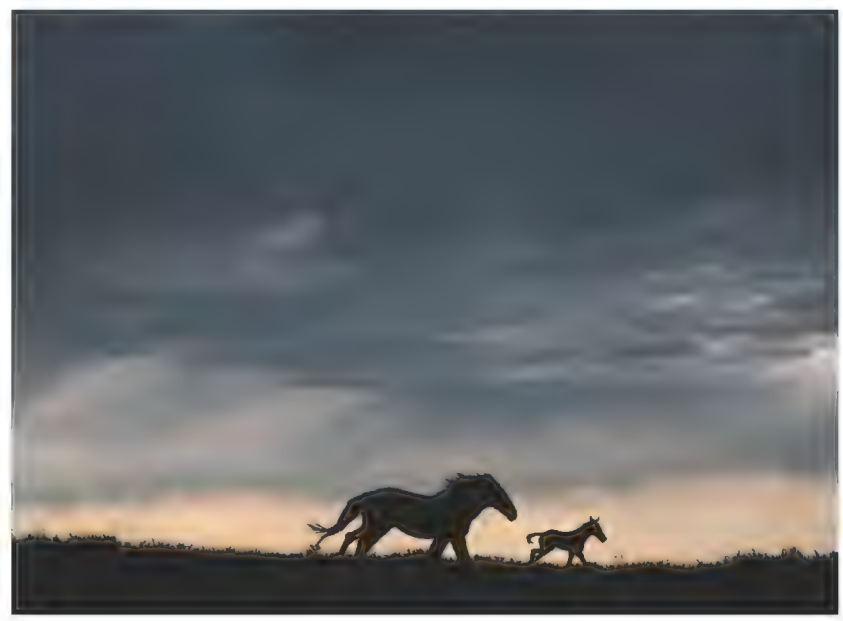
Captured mustangs are sold to private owners for an average of $125 apiece. But a horse is expensive to maintain and can live 25 to 30 years; adoptions of wild horses and burros were down from 5,700 in 2005 to fewer than 3,500 in recessionary 2009. Across the West, BLM workers are injecting some mustang mares with contraceptive drugs to limit herd size, and they may geld some stallions. In 2008, the agency announced its intention to euthanize some unadoptable horses; the plan was scrapped after a public outcry. More than 34,000 unwanted mustangs live out their days in government corrals and holding pastures; last year, holding costs alone were $29 million.

Mustang advocates find the idea of fenced-in wild horses distasteful in the extreme. The BLM "treat(s) the wild horses like livestock," says Karen Sussman, president of the International Society for the Protection of Mustangs and Burros, an organization first led by Wild Horse Annie. The horses, she says, should be treated "like wildlife."

"Mother Nature can be very cruel," says BLM spokesman Tom Gorey, and in areas crowded with horses the animals can starve to death. "The idea of just allowing nature to take its course—people don't have the stomach for that," he says. "We don't have the stomach for it either."

Farlow photographed several roundups, including one in the Jackson Mountains. She set up her remote-controlled cameras, then watched from a hillside as the horses pounded past, two helicopters buzzing above. A tame horse, known in the trade as a Judas horse, was released among the mustangs; they followed him into the corral and the gates were closed. "It's a bit heartbreaking," Farlow says. "Some of these horses are so beautiful that you want to say, 'Turn around and run!'"

ABIGAIL TUCKER, *SMITHSONIAN's staff writer, has written about lions, narwhals and monkeys called geladas.* **MELISSA FARLOW** *is a freelance photographer based in Sewickley, Pennsylvania.*

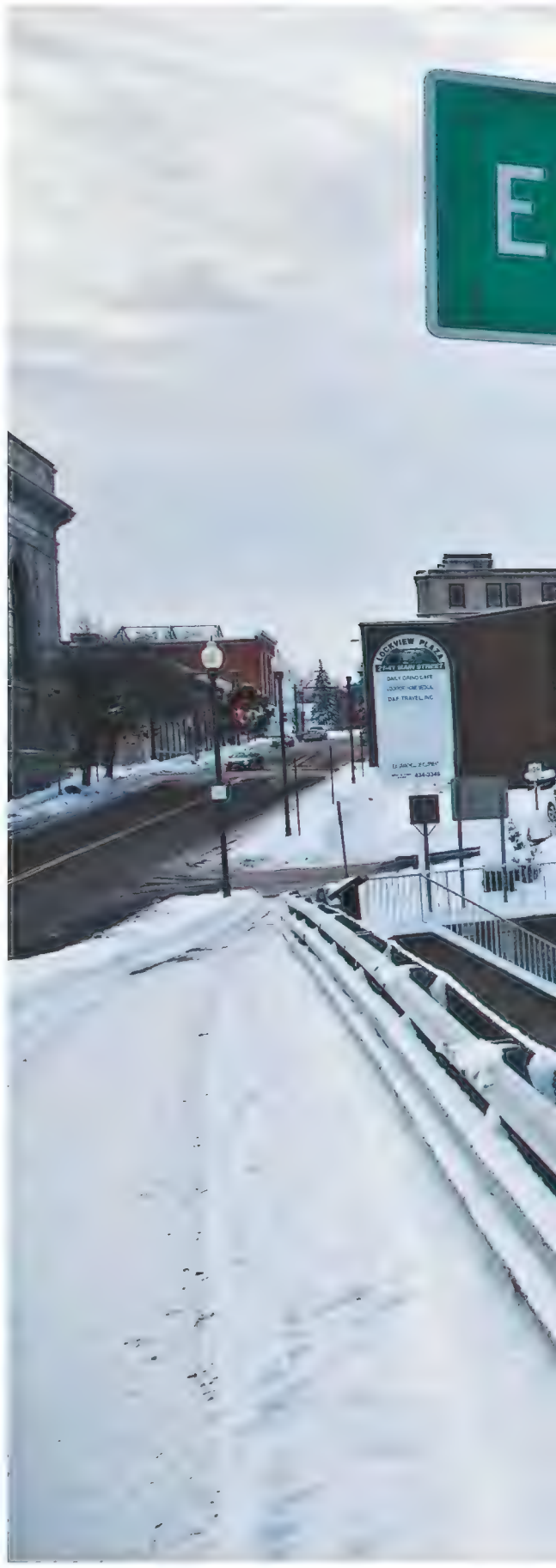


Going Home Again

The celebrated novelist returns to the upstate New York town where so much of her was formed

BY JOYCE CAROL OATES

PHOTOGRAPHS BY LANDON NORDEMAN



Writers, particularly novelists, are linked to place. It's impossible to think of Charles Dickens and not to think of Dickens' London; impossible to think of James Joyce and not to think of Joyce's Dublin; and so with Thomas Hardy, D. H. Lawrence, Willa Cather, William Faulkner, Eudora Welty, Flannery O'Connor—each is inextricably linked to a region, as to a language-dialect of particular sharpness, vividness, idiosyncrasy. We are all regionalists in our origins, however "universal" our themes and characters, and without our cherished hometowns and childhood landscapes to nourish us, we would be like plants set in shallow soil. Our souls must take root—almost literally.

For this reason, "home" isn't a street address or a residence, or, in Robert Frost's cryptic words, the place where,

"For residents of the area who have gone to live elsewhere, it's the canal—so deep-set in what appears to be solid rock . . . that resurfaces in dreams," says Oates (opposite).

"when you go there, they have to let you in"—but where you find yourself in your most haunting dreams. These may be dreams of numinous beauty, or they may be nightmares—but they are the dreams most embedded in memory, thus encoded deep in the brain: the first memories to be retained and the last memories to be surrendered.

Over the years of what seems to me both a long and a swiftly passing lifetime, "home" has been, for me, several places: Lockport, New York, where I was born and went to school, and nearby Millersport, New York, my home until the age of 18; Detroit, Michigan, where I lived with my young husband Raymond Smith, 1962-68—when he taught English at Wayne State University and I taught English at the University of Detroit; and Princeton, New Jersey, where we lived for 30

What most struck the young Joyce Carol Oates (below left: around age 10) about the Lockport Public Library (below right: in 1946 and, above today, as Katherine Miner, 7, peruses) were "the shelves and shelves of books . . . astonishing to a little girl whose family lives in a farmhouse in the country where books are almost wholly unknown."

years at 9 Honey Brook Drive, while Ray edited the *Ontario Review* and Ontario Review Press books and I taught at Princeton University, until Ray's death in February 2008. Now I live a half-mile from that house in a new phase of my life, with my new husband, Charles Gross, a neuroscientist at Princeton University who is also a writer and photographer. The contemporary French provincial house in which we live on three acres fronting a small lake is "home" in the most immediate sense—this is the address to which our mail is delivered, and each of us hopes that this will be the last house of our lives; but if "home" is the repository of our deepest, most abiding and most poignant dreams, the landscape that haunts us recurringly, then "home" for me would be upstate New York—the rural crossroads of Millersport, on the Tonawanda Creek, and the city of Lockport on the Erie Canal.

AS IN A VIVID AND HALLUCINATORY DREAM, I am being taken by my grandmother Blanche Woodside—my hand in hers—to the Lockport Public Library on East Avenue, Lockport. I am an eager child of 7 or 8 and this is in the mid-1940s. The library is a beautiful building like no other I've seen close up, an anomaly in this city block beside the dull red brick of the YMCA to one side and a dentist's office to the other; across the street is Lockport High School, another older, dull-brick building. The library—which, at my young age, I could not have known was a WPA-sponsored project that transformed the city of Lockport—has something of the look of a Greek temple; not only is its architecture distinctive, with elegantly ascending steps, a portico and four columns, a facade with six large, rounded, latticed windows and, on top, a kind of spire, but the building is set back from the street behind a wrought-iron fence with a gate, amid a very green jewel-like lawn.

The library for grown-ups is upstairs, beyond a daunt-

LOWER LEFT: COURTESY JOYCE CAROL OATES; LOWER RIGHT: LOCKPORT PUBLIC LIBRARY, LOCKPORT, NY

Every schoolday morning—from sixth through ninth grades—Oates hailed a Greyhound bus on a highway that ran near her rural home in Millersport, New York, to attend school in Lockport, seven miles away (above: Lockport's Spring Street).

ingly wide and high-ceilinged doorway; the library for children is more accessible, downstairs and to the right. Inside this cheery, brightly lit space there is an inexpressible smell of floor polish, library paste, books—that particular library smell that conflates, in my memory, with the classroom smell of floor polish, chalk dust, books so deeply imprinted in my memory. For even as a young child I was a lover of books and of the spaces in which, as indeed in a sacred temple, books might safely reside.

What is most striking in the children's library are the shelves and shelves of books—bookcases lining the walls—books with brightly colored spines—astonishing to a little girl whose family lives in a farmhouse in the country where books are almost wholly unknown. That these books are available for children—for a child like me—all these books!—leaves me dazed, dazzled.

The special surprise of this memorable day is that my grandmother has arranged for me to be given a library card, so that I can "withdraw" books from this library—though I'm not a resident of Lockport, nor even of Niagara County. Since my grandmother is a resident, some magical provision has been made to include me.

The Lockport Public Library has been an illumination in my life. In that dimension of the soul in which time is collapsed and the past is contemporaneous with the present, it still is. Growing up in a not-very-prosperous rural community lacking a common cultural or aesthetic tradition, in the aftermath of the Great Depression in which people like my family and relatives worked, worked and worked—and had little time for reading more than newspapers—I was mesmerized by books and by what might be called "the life of the mind": the life that *was not* manual labor, or housework, but seemed in its specialness to transcend these activities.

As a farm girl, even when I was quite young I had my "farm chores"—but I had time also to be alone, to explore the fields, woods and creek side. And to read.

There was no greater happiness for me than to read—children's books at first, then "young adult"—and beyond. No greater happiness than to make my way along the seemingly infinite shelves of books in the Lockport Public Library, drawing my forefinger across the spines. My grandmother was an avid reader whom all the librarians knew well, and whom they obviously liked very much; two or even three times a week she checked books out of the library—novels, biographies. I remember once asking Grandma about a book she was reading, a biography of Abraham Lincoln, and how she answered me: this was the first conversation of my life that concerned a book, and "the life of the mind"—and now, such subjects have become my life.

WHAT WE DREAM OF, THAT WE ARE.

What I most love about Lockport is its timelessness. Beyond the newer facades of Main Street—just behind the

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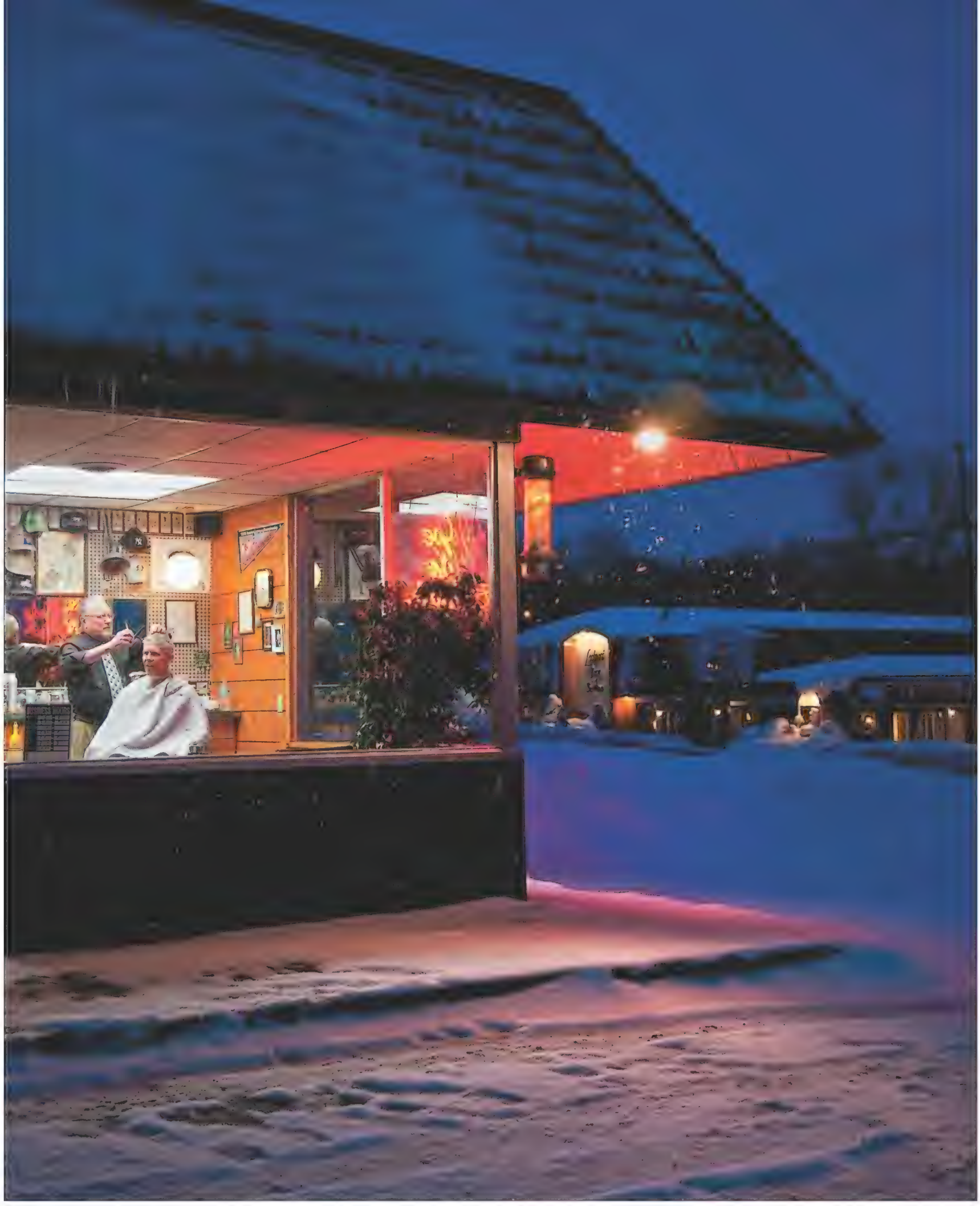
JOYCE CAROL OATES' *recent novel,* Little Bird of Heaven, *is set in a ficticious upstate New York town that bears a strong resemblance to the Lockport of her childhood. Photographer* **LANDON NORDEMAN** *is based in New York City.*



"What I most love about Lockport is its timelessness," Oates writes (above: Joe the Barber's shop). But, she adds, this is not "a consequence of nostalgic urban planning but of economic recession." Since 1950, the town has lost some 4,000 residents.

block of buildings on the northern side—is the Erie Canal: this impressive stretch of the 524-mile New York State Canal System connecting the Great Lakes with the Hudson River and traversing the breadth of the state. For residents of the area who have gone to live elsewhere, it's the canal—so deep-set in what appears to be solid rock, you can barely see it unless you come close, to lean over the railing of the wide bridge at the foot of Cottage Steet—that resurfaces in dreams: the singular height of the falling water, the steep rock walls, the gritty, melancholy smell of stone, froth, agitated water; the spectacle of the locks opening, taking in water and closing; the ever-shifting water levels bearing boats that seem miniaturized in the slow, methodical ritual-like process. "Locksborough," a contending name for the early 19th-century settlement, might have been a more accurate one, since there are numerous locks, to accommo-

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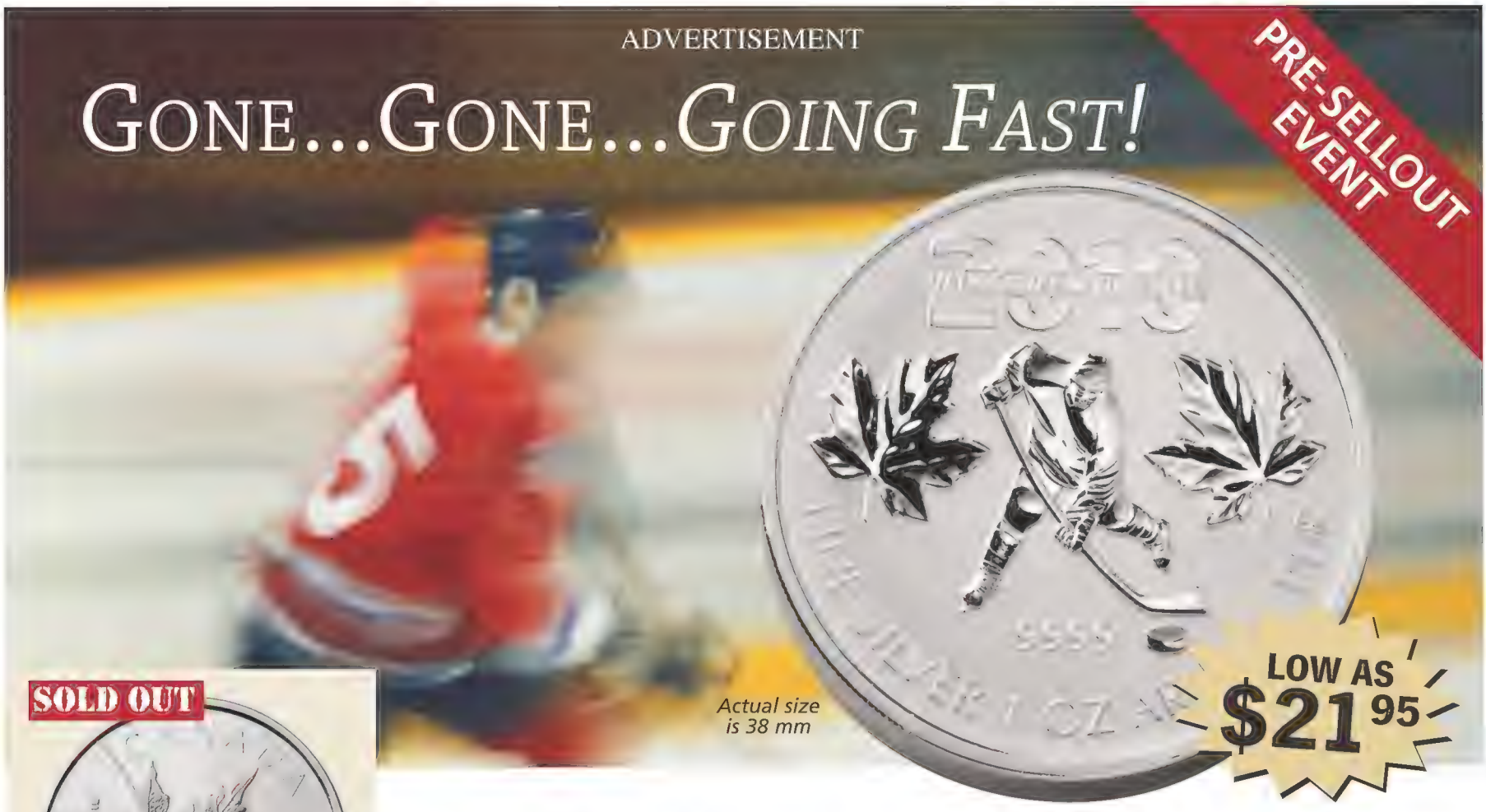

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"In the shadowy opulence of the Palace, as in an unpredictably unfolding dream, I fell under the spell of movies, as I'd fallen under the spell of books a few years earlier," the author writes (above: the Palace today). The Rialto was "less reputable."

date the especially steep incline of the land. (Lake Erie to the west is on a much higher elevation than the Hudson River, and Lockport—"Uptown" and "Lowertown"—is built on an escarpment.) Standing on the Big Bridge—"the widest bridge in the world," as it was once identified—you feel a sensation of vertigo as you peer down at, or into, the canal 50 feet below; not so overwhelming as the sensation you feel staring at the legendary falls at Niagara 20 miles to the west but haunting, unnerving and uncanny. (Think of "uncanny" in the Freudian sense—*Unheimlich*—a sign/symptom of a deep-rooted turbulence associated with buried and unarticulated desires, wishes, fears.) In the midst of city-life, at the very noon-tide of day-life, there is the primary, primitive vein of elemental life in which human identity is vanished, as if it had never been. Falling water, turbulent water, dark frothy water churning as if it were alive—somehow, this stirs the soul, makes us uneasy on even cheery visits back home. You stare down into the canal for a long dazed minute and then turn back blinking—where?

You didn't let Joyce see, did you? Oh—Fred!

Not a thing for a little girl to see. I hope she didn't . . .

An early memory of being with Daddy—in Lockport—and there is a street blocked with traffic and people—one of the narrow streets that run parallel to the canal, on the farther side of downtown—and Daddy has stopped his car to get out and see what is happening—and I have gotten out too, to follow him—except I can't follow him, there are too many people—I hear shouts—I don't see what is happening—unless (somehow) I do see—for I have a vague memory of "seeing"—a blurred memory of—is it a man's body, a corpse, being hauled out of the canal?

Joyce didn't see. Joyce was nowhere near.

Yes, I'm sure!

Yet years later, I will write of this. I will write of a little girl seeing, or almost seeing, a man's body hauled from a canal. I will write of the canal set deep in the earth; I will write of the turbulence of falling water, steep rock-sides, the roiling water, unease and distress and yet at the core, child-like wonderment. And I will write—repeatedly, obsessively—of the fact that adults cannot shield their children from such sights, as adults cannot shield their children from the very fact of growing up, and losing them.

SO STRANGE!—"UNCANNY."

That, between the ages of 11 and 15—through sixth, seventh, eighth and ninth grades—I was a "commuter student" first at John E. Pound School on High Street, Lockport; then at North Park Junior High in the northeast section of town near Outwater Park. (Though the term "commuter student" wasn't in anyone's vocabulary at that time.) For five grades, I'd gone to a one-room schoolhouse in Millersport—then for no reason that was ever explained, to me at least, I was transferred to Lockport, seven miles to the

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north—a considerable distance for a child at the time.

In this era before school buses—at least in this rural corner of Erie County—such commuter students were required to wait out on the highway for Greyhound buses. Decades later I can recall the sudden sight—at a distance of perhaps a quarter-mile—of the large bus emerging out of nowhere, at the intersection of Millersport Highway with Transit Road, headed in the direction of my family home on Transit.

The bus! Not a greyhound, it seemed to me, but a large ungainly beast—a buffalo, or a bison.

For my predominant fear, for years, was that I would miss the bus, and miss school, prospects to be dreaded. And there was the daunting fact of the bus itself—Where would I sit each morning? With whom?—most of the other passengers were adults, and strangers.

Here began my "romance" with Lockport, which I experienced as a solitary individual mostly walking—walking and walking—along the streets of downtown, and along residential streets; over the wide windswept bridge above the canal at Cottage Street, and over the narrower bridge, at Pine Street; on paths above the towpath, winding through vacant overgrown lots in the vicinity of Niagara Street; and on the shaky pedestrian bridge that ran unnervingly close beside the railroad tracks crossing the canal. Many days, after school I went to my grandmother Woodside's house on Harvey Avenue, and later on Grand Street, across town; after visiting Grandma, I took a city bus downtown, or walked; to this day, I have a proclivity for walking—I love to be in motion, and I am very curious about everything and everyone I see, as I'd learned to be as a young child; and so I have felt invisible also, as a child feels herself invisible, beneath the radar of adult attention, or so it seemed to me at the time. For Lockport, which I'd previously experienced only in the company of my mother, my father or my grandmother, seemed very different to me, when I was alone. The small city—26,000 residents in the 1950s, now

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22,000—became an adventure, or a series of adventures, culminating with the Greyhound bus to take me back home to Millersport.

Very few girls of 11 or 12 would be allowed today to wander alone as I did, or to take a bus as I did; to be allowed, or obliged, to wait for long headache-wracked minutes—or hours—in the dreary Lockport bus station, located near Lockport's largest employer, Harrison Radiator, a division of General Motors where my father worked as a tool and die designer for 40 years. (Why Daddy didn't drive me into Lockport in the morning and take me home in the late afternoon, I have no idea. Was his work schedule just too different from my school schedule? There must have been some reason, but now there is no one left to ask.) What a desolate, ill-smelling place the Greyhound bus station was, especially in winter!—and winters are long, windy and bitter-cold in upstate New York; what derelict-looking individuals were to be found there, slouched in the filthy vinyl chairs waiting—or maybe not waiting—for buses. And I in their midst, a young girl with textbooks and notebook, hoping no one would speak to me, nor even look at me.

I was prone to headaches in those years. Not so severe as migraines, I think. Maybe because I strained my eyes reading, or trying to read, in that wanly lit, inhospitable waiting room, as on the jolting Greyhound bus itself.

How innocent and oblivious the 1950s seem to us now, at least so far as parental oversight of children is concerned. Where many of my Princeton friends are hyper-vigilant about their children, obsessively involved in their children's lives—driving them everywhere, calling their cellphones, providing nannies for 16-year-olds—my parents seemingly had no concern at all that I might be endangered spending so much time alone. I don't mean that my parents didn't love me, or were negligent in any way, but only that in the 1950s, there was not much awareness of the dangers; it wasn't uncommon that adolescent girls hitchhiked on roads like

Transit Road—which I'd never done.

The consequence of so much unsupervised freedom was that I seem to have become precociously independent. For not only did I take the Greyhound bus into Lockport but from the bus station I walked to school; while at John E. Pound Elementary, I even walked downtown at noon, to have lunch in a restaurant on Main Street, alone. (How strange this is—wasn't there a cafeteria in the school? Couldn't I have brought a lunch packed by my mother, as I'd brought lunches in a "lunch pail" to the one-room schoolhouse?) Though I rarely eat in any restaurant alone as an adult, if I can avoid it, I loved these early restaurant excursions; there was a particular pleasure in looking at a menu, and ordering my own food. If any waitress thought it was peculiar that a girl so young was eating alone in a restaurant, it wasn't brought to my attention.

Later, in junior high, somehow it happened that I was allowed to see movies alone at the Palace Theatre after school—even double features. The Palace Theatre was one of those ornate, elegantly decorated dream-palaces first built in the 1920s; there was also, across town, the less reputable Rialto where Saturday serials were shown to hordes of screaming children. Of the prominent landmarks of Lockport, the Palace Theatre resides in my memory as a place of romance; yet romance fraught with some anxiety, for often I had to run from the theater before the second feature had ended, leaving behind its baroque splendors—gilt-framed mirrors in the lobby, crimson and gold plush, chandeliers, Oriental carpets—to rush to the bus station a block or two away, to catch the 6:15 p.m. bus marked Buffalo.

On schooldays Oates would eat lunch alone on Main Street (above, c. 1962). "How strange," she writes.

In the shadowy opulence of the Palace, as in an unpredictably unfolding dream, I fell under the spell of movies, as I'd fallen under the spell of books a few years earlier. Hollywood films—"Technicolor"—coming attractions—posters in the lobby: here was enchantment! These movies of the 1950s starring Elizabeth Taylor, Robert Taylor, Ava Gardner, Clark Gable, Robert Mitchum, Burt Lancaster, Montgomery Clift, Marlon Brando,

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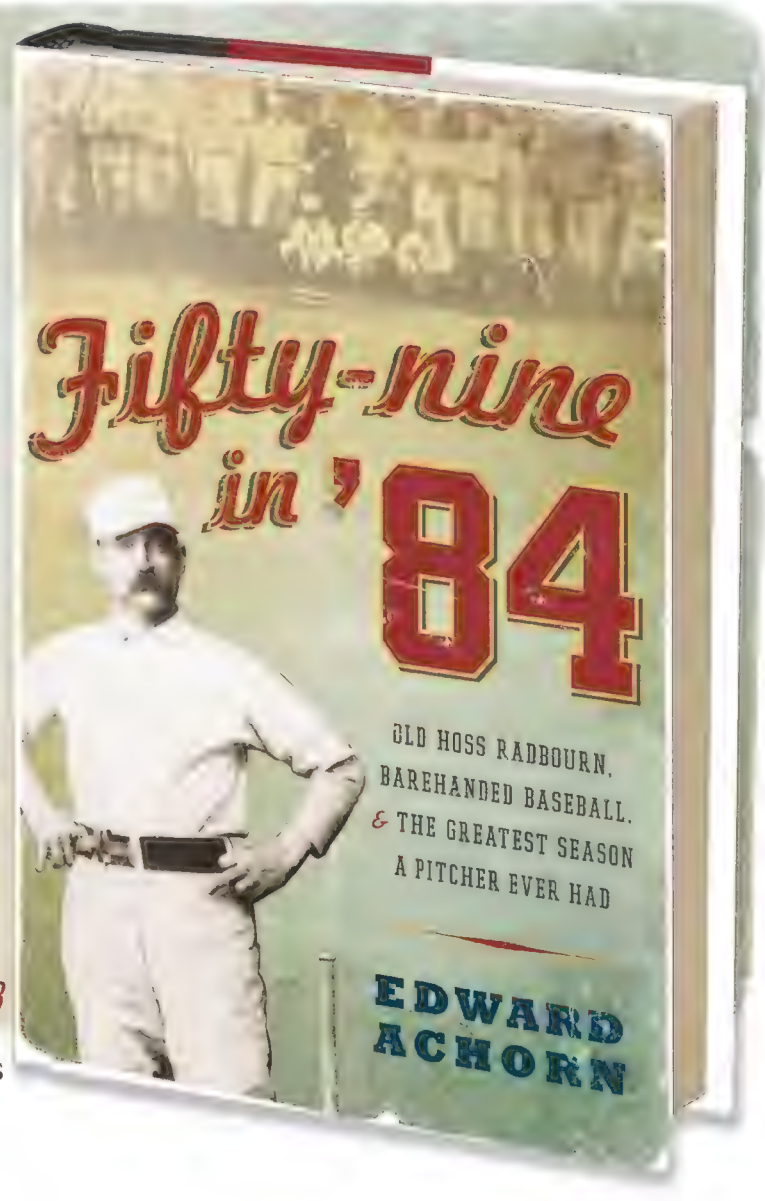

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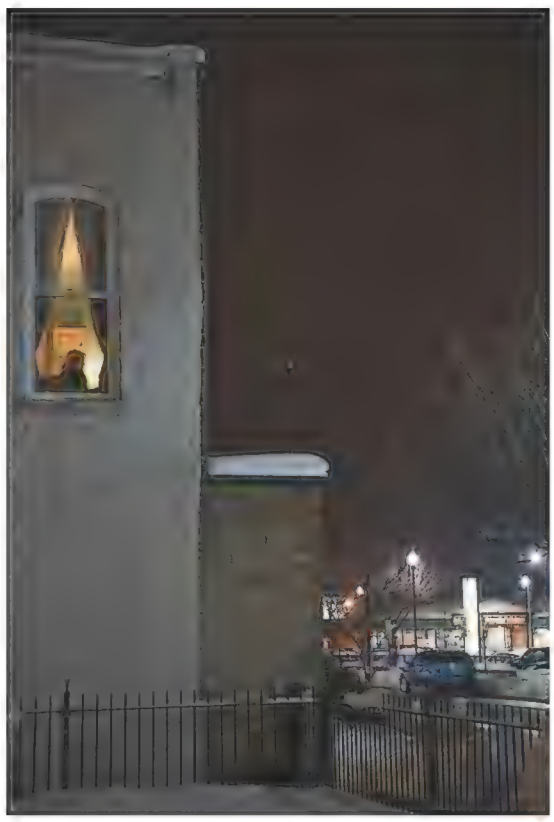
To my astonishment I realized that a man in front of me had reached down somehow through the back of his seat to grip my foot in his fingers; I gave a little scream.

Eva Marie Saint, Cary Grant, Marilyn Monroe—inspired me to a cinematic sort of storytelling, driven by character and plot; as a writer I would strive for the fluency, suspense and heightened drama of film, its quick cuts and leaps in time. (No doubt, every writer of my generation—of all generations since the 1920s—has fallen under the spell of film, some more evidently than others.)

From time to time, solitary men "bothered" me—came to sit near me, or tried to talk to me—quickly then I would move to another seat, hoping they wouldn't follow me. It was safest to sit near the rear of the movie house since ushers were stationed there. Once, sitting near the front, I felt an odd sensation—my foot being touched lightly—held, or pinched—as in a ghost-grip. To my astonishment I realized that a man in front of me had reached down somehow through the back of his seat to grip my foot in his fingers; I gave a little scream, and at once the man leapt to his feet and fled to an exit at the side, disappearing within seconds. An usher hurried down to ask me what was wrong and I could barely stammer an explanation, "A man—he was sitting in front of me—took hold of my *foot*."

"Your *foot*?" The usher, a boy of 18 or 20, frowned in distaste at this prospect, as I did—my *foot*! In some old *shoe*!

As there was no comprehending anything so preposterous, so totally un-

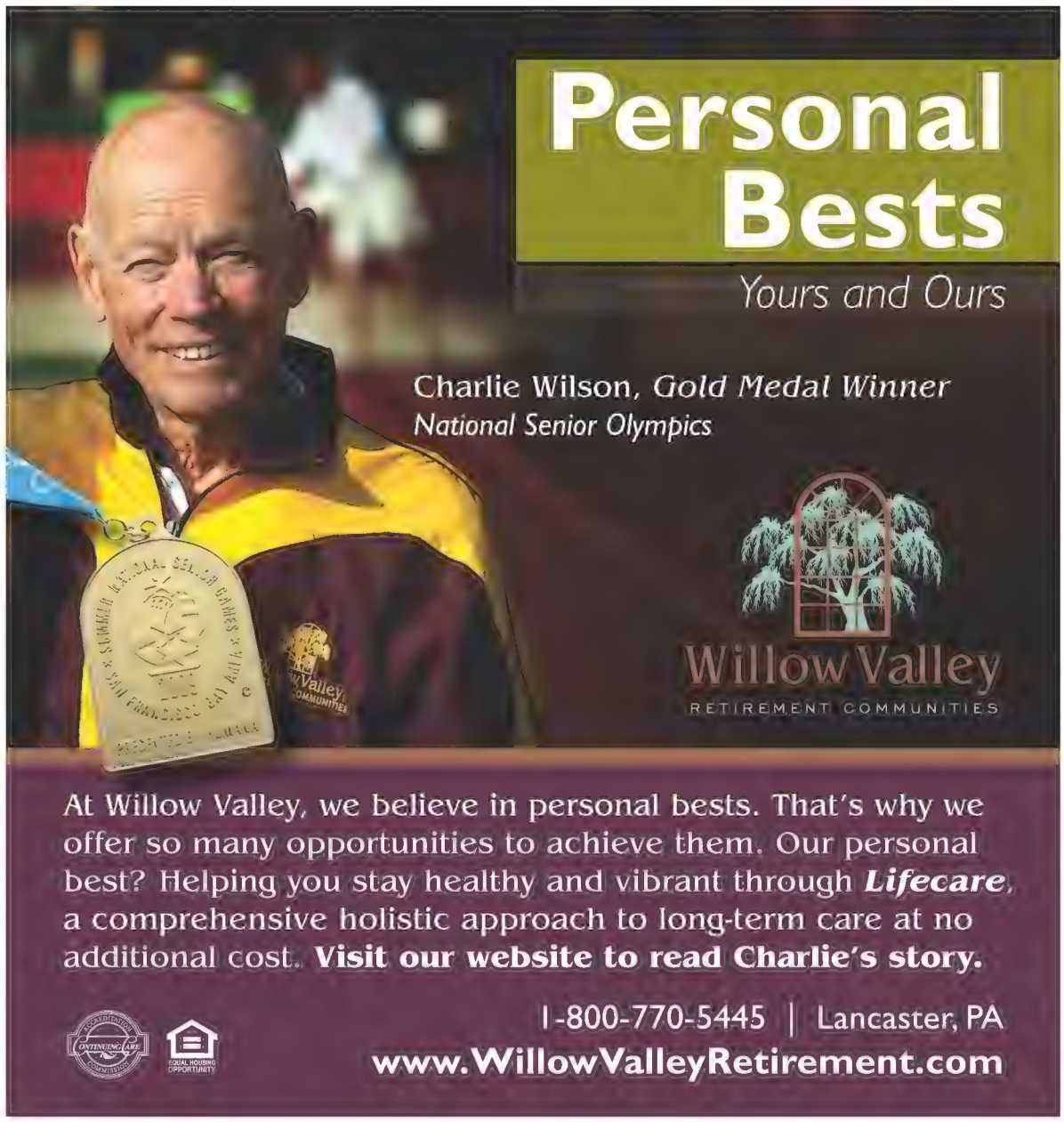


Lockport area terrorist Tim McVeigh likely felt—like Oates—"marginal."

natural if not silly, the moment of crisis passed—the usher returned to his post at the rear, and I returned to watching the movie.

I don't think that I have ever incorporated this random incident into any work of fiction of mine—it hovers in my memory as bizarre, and singular, and very *Lockportian*.

IT IS NOT BOASTED IN HISTORIES of Lockport and environs that, along with such renowned past residents as William E. Miller (Republican Barry Goldwater's vice-presidential running mate in the 1964 election, in which Democrat Lyndon Johnson was overwhelmingly elected), William G. Morgan (inventor of volleyball) and more recently Dominic "Mike" Cuzzacrea (world record-holder for marathon running while flipping a pancake), the area's most "known" resident is Timothy McVeigh, our homegrown terrorist/mass-murderer. Like me, McVeigh grew up in the countryside beyond Lockport—in McVeigh's case the small village of Pendleton, where his father still resides; like me, for a while, McVeigh was bused into Lockport public schools. Like me, he would have been identified as "from the country" and very likely, like me, he was made to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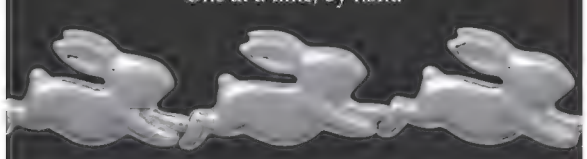

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feel, and may have exalted in feeling, marginal, invisible.

He may have felt powerless, as a boy. He may have been watchful, a fantasist. He may have told himself, *Wait! Your turn will come.*

In a piece I wrote for the May 8, 1995, *New Yorker*, on the phenomenon of McVeigh—so cruel, crude and pitiless a terrorist that he never expressed remorse or regret for the many lives he'd taken, even when he learned that some of his victims were young children and not employees of the detested "federal government"—I observed that Lockport, well into the present, suggests a more innocent time imagined by Thornton Wilder or Edward Hopper, appropriated now by movie director David Lynch: the slightly sinister, surreal yet disarmingly "normal"-seeming atmosphere of a quintessential American town trapped in a sort of spell or enchantment. That much remains unchanged over several decades—there is the Niagara Hotel on Transit Street, for instance, already seedy and disreputable in the 1950s when I had to pass by it on my way to and from school—is a consequence not of nostalgic urban planning but of economic recession. Harrison Radiator Company has been restructured and relocated, though its sprawling buildings at Walnut Street remain, mostly vacant, renamed Harrison Place. The derelict bus station has closed, replaced by a parking lot and a commercial building; Lockport High has long since vanished, moved to a newer side of town; the stately old Niagara County Bank has been reborn as a "community college." But the Lockport Public Library remains unchanged, at least from the street—the beautiful Greek temple-facade remains, and the jewel-like green lawn; to the rear, a multimillion-dollar addition has tripled its size. Here is unexpected change in Lockport—a good change.

And there remains the canal—dug by immigrant labor, Irishmen, Poles and Germans who frequently died in the effort and were buried in the muddy banks of the canal—a waterway now placid, stately, a "tourist attraction" as it never was in its days of utility.

"I am very curious about everything and everyone I see," says Oates (at age 11.)

In America, history never dies—it's reborn as "tourism."

POSTSCRIPT: OCTOBER 16, 2009. As a guest of the Lockport Public Library inaugurating a lecture series in honor of a legendary Lockport resident, beloved teacher John Koplas, from whom my parents had taken night classes, I have returned to my hometown city—in fact, to the Palace Theatre! Instead of the 20 to 40 people I'd envisioned, there is an audience of more than 800 crowded into the now "historic" theater; on the marquee where once such names as Elizabeth Taylor, Clark Gable, Cary Grant were emblazoned is *Joyce Carol Oates Oct. 16*, above *Hell Rell Oct. 17*—a rapper from New York City.

Unlike the downscale Rialto, the Palace has been smartly renovated and refurbished, reborn as a theater that sometimes shows first-run films but more often is rented out to traveling productions, amateur local theater and one-time events like this evening's. Before my presentation I am brought downstairs to the "green room"—a barren corridor of dressing rooms, a furnace room, closets—how unnerving this is, to find myself behind the scenes of the Palace Theatre, the temple of dreams! And in this starkly lighted setting, so antithetical to romance, to be confronting my past—as in one of

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On stage, I am greeted with enthusiastic applause. Perhaps I am perceived as one who has swum across a vast stretch of water, or climbed through an abyss.

those dreams in which one's life flashes before one's eyes—Am I really here? Here—in the Palace Theatre where long ago in the 1930s, before he'd started to work at Harrison's, my father Frederic Oates was a sign painter, making posters for coming attractions?

On stage, I am greeted with enthusiastic applause. Perhaps I am perceived as one who has swum across a vast stretch of water, or climbed through an abyss.

Am I really here? Is this—possible?

Fifty years since I've left Lockport, more or less—and now for the first time I have been formally invited back to "speak"—I can't resist telling the audience that I hope this will become a custom, and that I will be invited back again in another 50 years.

Scattered laughter, murmurings. Is "Joyce Carol Oates" being funny, or—ironic?

Gently ironic, in any case. For truly I am tremendously moved and my eyes are welling with tears, and I am particularly grateful that my brother, Fred, and my sister-in-law, Nancy, are here tonight in the audience—all that's left of my immediate family.

My presentation is informal, improvised, laced with "gentle ironies"—in fact, it's this very memoir of Lockport in an early handwritten draft. The audience seems appreciative, as if they are all old friends/classmates of mine—as if I am one of them and not a visitor who will depart in the morning. More than once I'm tempted to shut my eyes and in a feat of verbal legerdemain re-

The Lockport Public Library invited the author "home" to give a talk in 2009.

cite the names of long-ago classmates—names as deeply imprinted in my brain as the street names of Lockport—a kind of valentine-poem, a sentimental homage to the past.

At the end of my talk, amid a wave of applause—warm, welcoming, buoyant—I am presented with a framed pen-and-ink drawing of the Lockport Public Library, by gracious Marie Bindeman, the current director of the library.

How I wish that my mother, my father and my grandmother Blanche Woodside were here with me tonight—that they were alive to share this extraordinary moment. *How proud we are of you, Joyce!*—for pride is the lifeblood of family, recompense for hardship, endurance, loss.

Unexpected questions from the audience: "Do you think that there is a teleological purpose to the universe, and do you think that there is an afterlife?" Yet more unsettling: "Do you think that you would be the writer you are today if you'd had a middle-class or wealthy background?"

These questions, that seem to me not at all Lockportian, stop me in my tracks. Especially the second. Beyond the blinding lights, 800 people are waiting for my reply. In the exigency of the moment it seems that they really want to know, Without Millersport and Lockport—would there be "Joyce Carol Oates"?

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Leagues of Their Own

From underwater hockey to chess boxing, some hybrid sports aren't yet ready for prime time **BY MEGAN GAMBINO**

LONG WINTERS without cable television in rural Vermont prompted some college friends and me to invent "tennis golf." The game involved taking a racket and whacking a ball through a course of several landmarks, including a bronze panther, the school's mascot. None of us were particularly good at tennis—or at golf, either, for that matter. But we were proud of our invention, even if we weren't likely to make it to the Olympics.

Perhaps I would have stood a better chance of bringing home a gold medal if tennis golf were more physically demanding. Extreme hybrid sports are popular events at the Olympics. Athletes have competed in the biathlon, which combines skiing with target shooting, since 1960. Synchronized swimming, which incorporates dance and gymnastics, became an official event in 1984. Snowboard cross, which hit the slopes in 2006, combines elements of surfing and motorcycle racing. And, this year, the Winter Olympics in Vancouver planned the debut of ski cross, where four skiers tackle a course of jumps, rollers, hairpin turns—and each other.

But for every hybrid sport that gets the Olympic seal of approval, there are dozens of others languishing in obscurity. Have you heard of primitive biathlon, where snowshoes and muskets replace skis and rifles? Although period dress is not required, it is encouraged. Hence, every year, wannabe Davy Crocketts in coonskin caps and fringe leather jackets come out of the woods for the Smugglers' Notch Primitive Biathlon in Jeffersonville, Vermont.

Another winter sport, skijoring, mixes cross-country skiing and dog mushing. Yes—cross-country skiers being pulled by their dogs. "Virtually any breed dog can learn to skijor," one Web site declares, including poodles. ("Onward, Babette! Faster! Faster!")

Are you wobbly on ice skates? Then consider underwater hockey (a.k.a. octopush), where two teams of six snorkelers duke it out on the bottom of a swimming pool, pushing a puck with a foot-long stick.

And the list goes on: canoe polo, unicycle hockey and chess boxing—which is, literally, alternating rounds of chess and boxing. (Bare fisted for the chess, of course.) Chess boxing combines "the #1 thinking sport and the #1 fighting sport into a hybrid that demands the most of its competitors—both mentally and physically," states the World Chess Boxing Organization. Finally, an opportunity to pummel that snarky opponent who forced you to sacrifice your rook.

Excelling at any sport requires physical and mental discipline. But hybrid athletes must bear an additional burden—convincing people that their sports are actually sports. They point to governing bodies that operate under the belief that legitimacy is directly proportional to the number of "official" rules on their Web sites. Sometimes, hybrid sport enthusiasts resort to more desperate tactics. For instance, while you may find it hard to believe that getting a tow from your labradoodle provides roller-coaster-type thrills, one skijoring site begs to differ: "Do you enjoy the rides at Six Flags or Busch Gardens?" it asks. "If so, Skijor Sprint Racing is for you." The Underwater Society of America points out that, on top of being an incredible workout, underwater hockey is an "instant conversation starter at dull parties!" ("Did you hear about my hat trick in the deep end?") And the World Chess Boxing Organization trots out a time-honored pitch: "Women think chess boxing is sexy."

So, what's next? Reverse skijoring, where the owners pull their dogs? Kayak archery? I have an idea that's even better than tennis golf: pole vault diving. Just imagine pole-vaulters hurling themselves over the crossbar and then gracefully somersaulting into a pool. If only the International Olympic Committee would return my calls.

MEGAN GAMBINO *is an editorial assistant at* SMITHSONIAN.

ERIC PALMA